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TRIAL TRIP OF THE MAINE.

Philadelphia, Aug. 24—The battleship Maine has again been tried and not found wanting. The big vessel reached her dock at the Cramp yard early this morning after having proved for a second time that she is the fastest craft of her class afloat. The official report of the Maine's final trial trip was telegraphed to the navy department by Capt. Train, president of the trial board, as follows:

"The trial of the battleship Maine successfully completed. The mean speed, uncorrected for tidal errors, 17.96 knots."

It is stated that the corrected figures for tidal allowance may make a slight change, showing a greater or less speed. The test of the Maine took place off Cape Ann on Saturday. For four consecutive hours she raced over the sea, maintaining throughout a speed, which when tidal allowance is completed, it is confidently asserted will reach at least 18.3 knots. The trial was remarkable in many ways. First it was run under regular service conditions with unpicked coal and an ordinary crew of stokers. Again no special preparations were made to force the last inch out of her.

"I would rather get 18.3 out of her as I feel sure we did," said E. S. Cramp, yesterday, "than race her at 19 knots over the course. What she did on Saturday she can do any day."

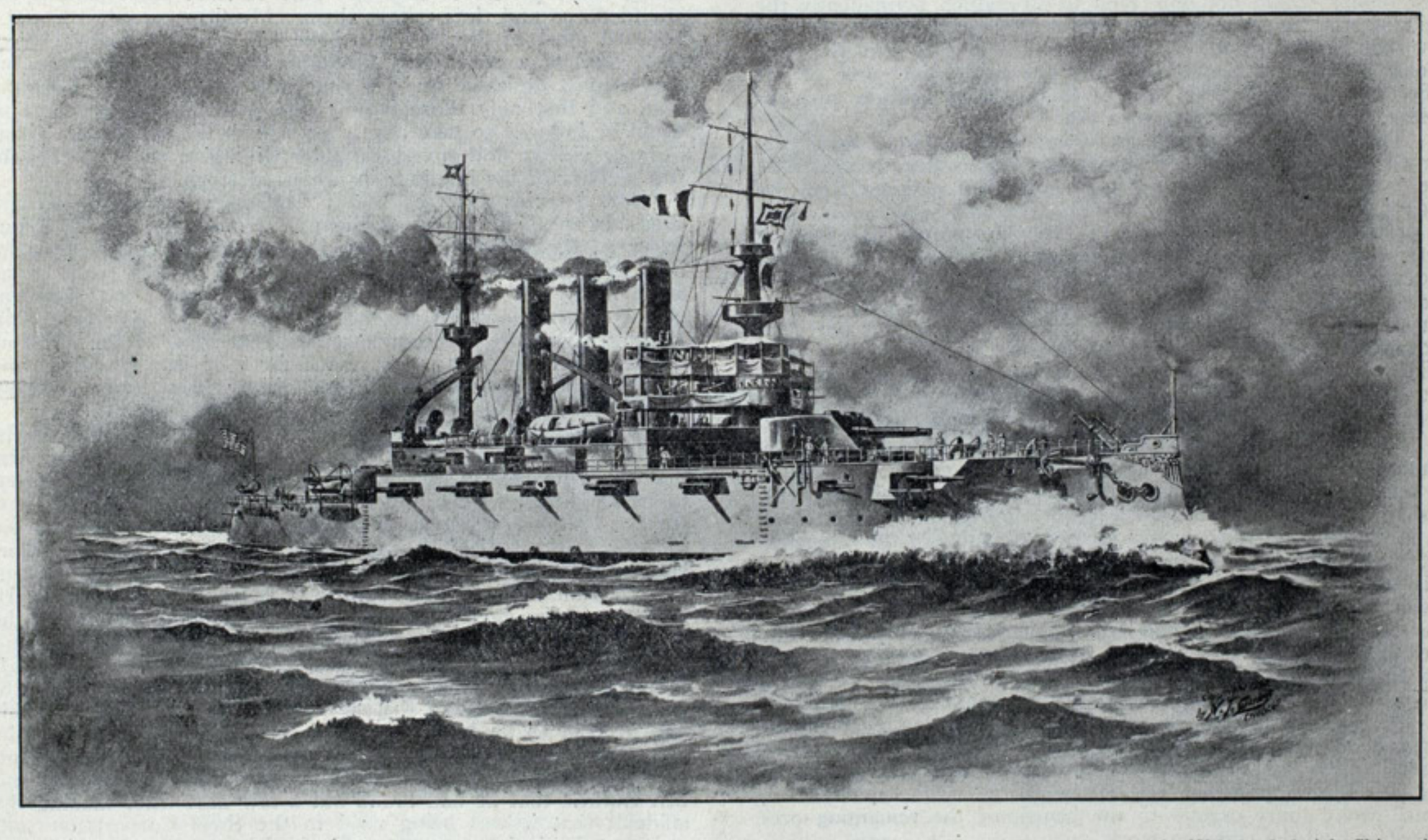
The Maine's contract calls for 18 knots an hour for four continuous hours steaming. At 11:27 a. m. on Saturday the great craft swung past the first marked boat off Cape Ann, going then at a 17.61 clip, and this in face of head wind and sea. Past mark boats 2, 3, 4 and 5 she sped and on one leg in the zone of most wind and currents she fell as low as 17.23. As she cleared the last boat, No. 6, her helm was jammed hard down and back over the course she flew as if in determination to make amends for the outward run. Every leg on the return journey showed better than 18 knots, the next to the last at 18.7 and in the final burst over the line at 18.95.

As the Maine passed the last stake boat she was immediately put through her side paces. "Hard starboard" to "hard-aport" the helm was reversed and for an hour the big vessel cut a gigantic figure 8 in the ocean, turning completely in little over twice her length, and handling so easily that it could scarcely be credited that the giant hull was drawing 23 ft. 6 in. of water, the displacement being 12,350 tons. In 10 seconds she was brought from full speed to a stop and then in 1 minute 3 seconds she was sent from full speed ahead to full speed astern.

The propellers during the main trial raced through the water at from 122 to 130 revolutions per minute. The machinery throughout worked without a hitch save in one trifling instance. This was in the final test when the anchor was dropped by letting it run free. It went down charmingly but when the order was given to up-anchor the hitch came. In some way the chain slipped on the winch and almost an hour was spent in trying to get the matter right. Finally a tackle was put on and it was hoisted aboard.

The old Maine, which the new vessel replaces, had a displacement of 6,080 tons. The new Maine, when full armament is aboard will have displacement of 13,500. The former did about 17 knots, while her builders are confident that should occasion demand the latter can, under forced draught, make the 19.95, which was the top notch at her builder's trial.

Dr. George R. Parkin, principal of upper Canada college, and organizer of the plans for bestowing the Cecil Rhodes scholarships, has this to say of J. Pierpont Morgan with whom he recently crossed the Atlantic: "He is a most interesting man, a man of a remarkable personality, great breadth of view and sound common sense. The line of thought that he is working on is very interesting. For instance, he says: 'Here I went out a month ago on the Oceanic, carrying 300 passengers, when she might as well carry 500, and with only half a cargo. The same day an American liner goes out with fifty passengers instead of 300, and with half a cargo. The Oceanic might as well have carried the whole number and half the cargo. Two thousand tons of coal burned on one trip is simply wasted. So it is with all the lines; there is a tremendous waste, and if I can stop that waste it will be better for everybody; better for the workingman too.'"



The Battleship Maine on her Trial Trip. *(From a drawing by Nicholas J. Quirk, Chicago.)*

The London, Brighton & South Coast railway has decided to use a turbine steamship between New Haven and Dieppe. It is expected that she will be ready early next year.

ANSWER OF STEEL CORPORATION.

Supplemental affidavits in behalf of the United States Steel Corporation were filed in the New Jersey court of chancery at Trenton on Saturday last in the suit brought by J. Aspinwall Hodge to restrain the steel corporation from converting $200,000,000 7 per cent. preferred stock into $200,000,000 5 per cent. mortgage bonds and issuing $50,000,000 additional bonds for improvements. Chief among the affidavits is one by George W. Perkins, a director of the steel corporation and chairman of its finance committee, who is a member of the banking firm of J. P. Morgan & Co., outlining the policy of the steel corporation and explaining in full the reasons for the conversion plan. Mr. Perkins' affidavit is very interesting. Whether it is altogether satisfactory is another matter. It would seem as though the money might be secured in part by withholding common stock dividends. The reason given that it would be unfair to stockholders does not seem to be sufficient. On the contrary by the issuance of bonds the holdings of the common stockholder are made less secure, since he must take what's left after the bonds and preferred stock have been satisfied.

Mr. Perkins says in his affidavit that soon after the organization of the Steel Corporation the executive and finance committees began an investigation as to the extent, condition, capacity, and needs of its several properties. Then he says:

"After a year's close application to these problems, and after substantial economies had been realized. the executive committee brought to the attention of the finance committee the advisability of providing about $40,000,000 of cash, to be used in improving and extending the various plants of the subsidiary companies and reimbursing and capitalizing between $15,000,000 and $20,000,000 which had been expended for purchases and construction of various kinds undertaken by the subsidiary companies just prior to the organization of the Steel Corporation. The subject was considered for many weeks. The members of both committees became convinced that the expenditure of this new money would not only tend to strengthen permanently the existing earning capacities, but would increase the net profits not less than $10,000,000 a year. This was the lowest estimate of the probable increased profits that any one made, but some of the officers of the corporation advised that, in their opinion, such increase would equal $20,000,000 a year."

The problem of raising the funds; Mr. Perkins says, presented serious difficulties. The finance committee decided that the corporation could not risk taking the sum required from the $50,000,000 surplus, and that the funds would have to be raised or provided either by the issue and sale of preferred stock or by borrowing on notes and bonds. It was decided that the issue of $50,000,000 in 7 per cent. preferred stock, the market price of the stock being 90, would be too expensive, and a like decision was reached as to the suggestion that $50,000,000 in 5 per cent. second mortgage bonds be issued, because it was felt that such bonds could not have been sold at a price higher than 95, and because the bonds would have made an increased charge ahead of the stocks. Mr. Perkins's affidavit then goes on:

"It was finally determined that the most economical and advantageous plan was to create and issue $250,000,000 face value of second mortgage bonds and use the bonds or their proceeds, first. in procuring the necessary cash requirements, and, second, in purchasing and retiring $200,000,000 par value of the outstanding 7 per cent. cumulative preferred stock. The retirement of this stock would save $14,000,000 per annum of the cumulated dividend charge, and this sum would not only provide the interest upon the whole issue of new bonds, but leave a surplus of $1,500,000 per annum, which would be sufficient to provide a sinking fund for the payment, at or before maturity, of the bonds, and leave besides $450,000 per annum net applicable to dividends on the common stock. In other words, the plan enabled the corporation to procure the new capital without increasing its annual outgo for interest and cumulative preferred dividends, and in addition provided for the reduction of its capital stock, which woud inure greatly to the benefit of the remaining preferred and all the common stock."

On account of the difficulty of securing preferred stock to be converted into bonds, Mr. Perkins says, the best that could be done was to organize a syndicate that would agree to the following:

"First—Purchase and lodge with J. P. Morgan & Co., $80,000,000 of preferred stock.

"Second—Agree to exchange all of this or only 40 per cent. of it, at the option of the Steel Gorporation, for second mortgage bonds.

"Third—Take second mortgage bonds from the Steel Corporation at par in exchange for $20,000,000 in cash.

"For this the Steel Corporation was to allow the syndicate 4 per cent. commission on all the bonds it took in exchange for stock, and 4 per cent. commission on all the bonds it took at par for cash, so that if the transaction stood in the end in that form, viz., if $80,000,000 of bonds were issued for stock and $20,000,000 of bonds were issued for cash the Steel Corporation would have paid to the syndicate 4 per cent. on $100,000,000, or $4,000,000; and J. P. Morgan & Co. would have received for guaranteeing the whole $100,000,000, for handling the syndicate and the securities, and for finding a market on behalf of the syndicate, one-fifth of $4,000,000, or $800,000. The contract, moreover, was made subject to the approval of the stockholders."

The Steel Corporation reserved the right to offer to every preferred stockholder in the corporation the option to subscribe for these new bonds to the extent of 40 per cent. of his preferred stock, and said that if every preferred stockholder exercised his right and took 40 per cent. of bonds in exchange for his stock the syndicate would be placed in the position where it would only get $32,000,000 of its $80,000,000 of preferred stock converted into bonds, and would be left with $48,000,000 of preferred stock on its hands, although it pledged itself to tie up $80,000,000 of stock for eighteen months, and could not sell it or in any way dispose of it no matter what the price changes in the stock might be, or what the business conditions in the country, or how much any syndicate subscriber might need the funds. In consideration of all this risk, said Mr. Perkins, the syndicate was empowered to receive a commission of 4 per cent on such bonds as were issued to preferred stock holders not members of the syndicate. The $10,000,000 maximum to the syndicate can only be received by it, provided the entire transaction of purchasing $200,000,000 of preferred stock and retiring it, and then issuing and placing on the market $250,000,000 of second mortgage bonds at par, is completed and consummated.

The money needed could have been raised, Mr. Perkins says, by stopping dividends on the preferred and common stock for one year, or on the common stock alone for two years and a half, but this course was deemed unfair to the stockholders, and particularly to the holders of common stock, which was in the hands of thousands of small holders, and in many cases had been taken in exchange for stock of other companies which were paying dividends. Continuing Mr. Perkins says:

"The largest participations in the syndicate were taken only after urgent solicitation by me, and upon my agreeing that my firm would take an equal amount. The participation taken by Mr. Schwab, the president of the corporation, and by some of the other directors, was upon the understanding that, if we found other parties to take any part of such participations, we would do so and thus relieve them. My firm considered, and I believed most of the directors believed, that the syndicate contract was not a particularly profitable one for the syndicate, but was a most desirable one for the United States Steel Corporation, and that only those largely interested in that corporation, could be induced to take any large risk in the syndicate. In no instance did we find any stockholder willing to subscribe for the full amount of his holdings in preferred stock."

Mr. Perkins declares that a statement made by Bernard Smith in an affidavit, that William H. Moore, Norman B. Ream, Peter A. B. Widener and John D. Rockefeller, Jr., were members of the syndicate, was untrue, and it is set forth in an affidavit by the keeper of the syndicate books that sixty-one others named by Smith are not members of the syndicate. Mr. Perkins says there was announcement that some of the directors of the Steel Corporation were members of the syndicate, and any stockholder could have ascertained their names without trouble.

An affidavit by George A. Day, an attorney and one of the supreme court commissioners of Nebraska, says his law firm had been employed in March, 1890, by a man representing himself to be David H. Lewis, and that on Aug. 16, this year, he saw Lewis in New York, and that he was told that Lewis was known in New York as David Lamar. An affidavit by Joseph E. Corrigan, of the law firm of Guthrie, Cravath & Henderson, tells of a confession made to Mr. Guthrie in his presence by James H. Lancaster, who gave testimony for Hodge to the effect that the entire plan of the United States Steel Corporation was not worth more than $500,000,000. Mr. Corrigan says Lancaster admitted that when he made the affidavit he did not know it was to be used in any suit, and that he had been governed only by his impressions, as he had understood that the affidavit was to be used only in an advisory way in the matter of stock investment. Corrigan goes on to swear that Lancaster stated to himself and Mr. Guthrie that he had found out a few days after making the affidavit that it was being used in the Steel Corporation suit, and that he had protested to David Lamar, who had induced him to make the affidavit. Lamar then, according to Lancaster's statement, had agreed to pay Lancaster $250 a week and $10,000 when the suit was settled. Lancaster had then made a second affidavit and received $400 Subsequently he had had a dispute with Lamar about his compensation, and finally received $500, making a total of $1,000, he having had $100 for his first affidavit.

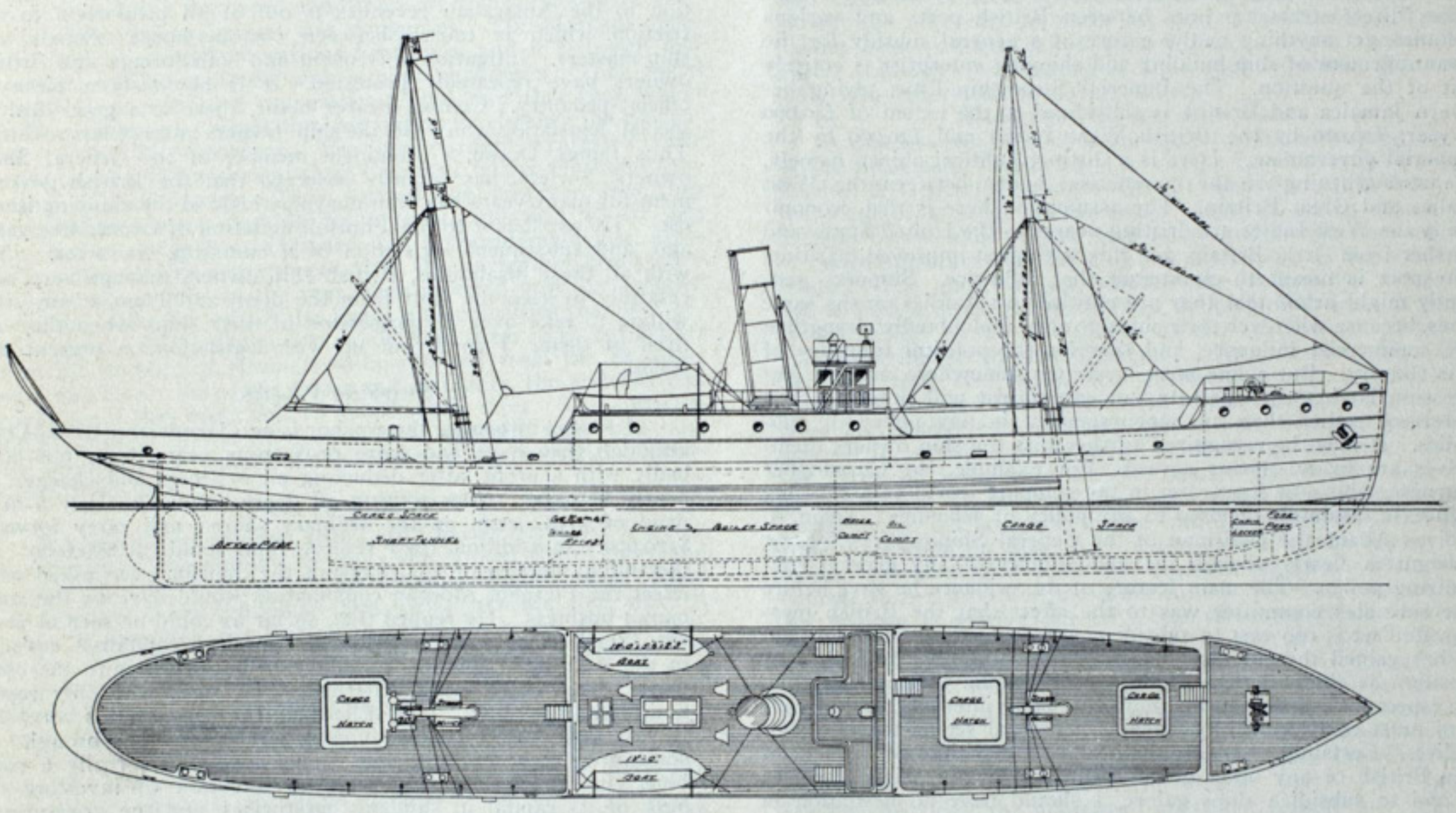
Affidavits by William J. Filbert, controller of the Steel Corporation, and James J. Campbell, auditor of the Carnegie company, are presented to refute Lancaster's estimate, and to sustain the valuations of the Steel Corporation's properties recently given in affidavits by Charles M. Schwab, president of the corporation.

The five-masted wooden schooner Paul Palmer has been launched from the yards of George L. Welt, Waldboro, Me. Her dimensions are: Length, 254 ft.; beam, 44 ft.; depth, 25 ft. Work has already begun on the fourth five-master built by Mr. Welt for Mr. Palmer. She will be christened Dorothy Palmer.

Washburn Bros., Thomaston, Me., launched the four-masted schooner Harry T. Hayward last week. Her dimensions are: Keel, 180 ft.; beam, 40 ft.; depth of hold, 19 ft.

NOVEL TYPE OF FISHING STEAMER.

A novel type of vessel has just been launched at the Crescent ship yard, Elizabeth, N. J., for the Gulf Fisheries Co. of Galveston, Texas. Her principal dimensions are: Length over all 177 ft.; beam, molded, 24 ft.; depth, 14 ft.; draught, 10 ft.; displacement 500 tons: speed 14 knots with 900 H. P. She has a triple-expansion engine with cylinders of 14, 21 and 35 in. diameter and 24 in. stroke of piston, using steam at 250 lbs. pressure, supplied by two Almy water-tube boilers of 80 sq. ft. grate surface. The steamer, which was christened Anstice by Mrs. Joseph R. Grismer, is of the flush deck type with bridge and forecastle accommodations for officers and crew. The service of the vessel is a novel one. She is intended to steam from Galveston, Texas, to a point off the coast of Mexico where she will meet a regular trawling fleet and obtain from them her regular cargo of fish. She will then steam to the market at top speed, and owing to her steaming powers will offer fresher fish for sale than could hitherto be obtained. Her freight spaces are thoroughly insulated and kept cool by an elaborate system of refrigerating machinery, which will keep the catch of fish in prime condition no matter what the temperature may be. The Anstice has two pole masts with the necessary derricks for handling cargo through three large deck hatches. She has steam windlass and winches and combined steam and hand steering gears worked from the pilot house of flying bridge. A powerful searchlight is also operated from the flying bridge. She is lighted throughout by electricity. Owing to the fact that her hailing port is so close to the Beaumont oil fields, she will use oil as fuel, specially constructed oil bunkers being provided for that purpose.



The Fishing Steamer Anstice. Built at Lewis Nixon's Crescent Ship Yard, Elizabeth, N. J.

FUEL OIL FOR TRACTION PURPOSES.

Recently Mr. C. M. Hays, general manager of the Grand Trunk railway and formerly president of the Southern Pacific railway, wrote to the editor of the London Financial News on the subject of the oil fields in Texas and the application of oil to traction purposes. In his note Mr. Hays related that the Southern Pacific made considerable progress in the utilization of oil as fuel, having equipped in the neighborhood of 150 locomotives with the oil burners. Four barrels of oil are considered the equivalent of a ton of coal for steam producing purposes. Coal costs the Southern Pacific about $6 per ton in California and about $2 in Texas, and Mr. Hays made contracts for oil on the basis of about 20 cents a barrel, so one may easily estimate the economies to be obtained by the substitution of oil for coal in locomotive service. The principal expense in connection therewith is the building of tanks for storage purposes. These were constructed at fuel station points, with a capacity of some 40,000 barrels. The appliance for burning oil can be placed on an engine at a total cost not exceeding $100 per engine. Mr. Hays remarks that perhaps the Grand Trunk is too remote from the oil fields of Texas to make practicable the substitution of petroleum for coal, although if Ontario oil fields were ever to reach a development of any magnitude it might well do so. The Grand Trunk buys its coal at the Detroit river for from $1.50 to $2 per ton, and the freight charges on Texas oil, added to the cost of the oil itself, would exceed present cost of coal. There are some disadvantages in the use of oil in the effect of the extreme variations of temperature on the fire-box and boiler which adds to the expense of their maintenance, but this is not of sufficient importance to offset the advantage in the use of oil in places where the cost of fuel has reached any material figure. Results such as those indicated in the foregoing, coupled with the recent experiments conducted by the naval arm of the United States government, are of special significance in this period of high-priced coal.

CHAIN BOATS ALSO ON THE RHINE.

In the last issue of the Review there was published an article by Consul General Cole at Dresden, on the chain boats of the Elbe. It appears that the Elbe is not the only river in Germany on which this method of propulsion is employed. It is used on the swifter parts of a number of the other rivers and notably on the Rhine. This stream, the greatest freight carrier among the rivers of Europe, has a very swift current for most of the way through the highlands that have made the Rhine famous; and while the lighter and powerful passenger steamers can stem the rapid onflow of the river, the slow and heavy-laden freighters could make scarcely any headway if it were not for the chains laid on the bottom of the river that follow its sinuosities for scores of miles. This method of propelling freighters has been in use in Germany for about forty years. There are perhaps 100 large freighters on the Rhine, all of which are provided with propellers, though they are used only along the stretches where the current is comparatively sluggish; but in the long reaches, where the current is swift, the chain is the sole dependence both going up and down the river. It takes only a minute when an end of the chain is reached to pass it through the two sets of rollers on board. Special machinery on the vessel starts the rollers turning and the chain is constantly being pulled aboard over the bow and dropped astern into the river again. But the chain not only provides locomotion for the freighter, but also for four to six barges that are usually in tow, carrying about 2,000 tons of freight in addition to the cargo on the steamer. It has been found that these chain boats can carry and tow a large amount of freight at an expenditure of only one-third the power required by the big side-wheel towboats on the Rhine and other rivers; there is accordingly a large saving of fuel. The chain has proved to be a very economical means of propulsion and has, therefore, come to be an important facility for transportation on the German rivers.

Many tourists going up or down the Rhine have their first introduction to this curious means of propulsion when they see one of these odd-looking vessels, with big revolving rollers on the deck, pulling a chain on board and dropping it behind them. Their attention is for the moment diverted from the castles on the Rhine to this new thing under the sun. They are eager for an explanation of the phenomenon and are certain that they have acquired some useful information when they learn that chains at the bottom of the Rhine have an important part in the commerce of the river. Only the heaviest and bulkiest material is carried by these chain boats. The cargoes from the mountain regions of the south consist of building stone, lumber, coal and merchandise; and the freight taken up the river is grain, flour, kerosene, anthracite and merchandise.

BRITISH SHIPPING MATTERS.

It is not Likely that England will ever consent to a Subsidy—Profits of Shipping—St. Lawrence River Insurance—New Graving Dock and Cunarder.

(From our London Correspondent.)

London, Aug. 9.—I do not believe that the British nation will ever agree to any system of shipping subsidies. It is necessary in this instance carefully to define what is meant by subsidy. In my opinion it is erroneous to speak of a subsidy where the government advances a fixed annual sum of money for mail purposes or as a lien upon any particular line of steamers to be used as British armed cruisers in case of naval warfare. The strict meaning of the word "subsidy" is undoubtedly "aid in money." Doubtless the use of the word in connection with shipping comes down from other days when subsidies were paid by one prince or nation to another for assistance in war. Clearly, however, in the commercial sense, a subsidy, whatever may be its political objects, is not the expenditure of money for value received. Thus, if the Cunard, White Star or other Atlantic lines are subsidized by the British government, it is not for a political object but for the value received, namely the putting of the vessels into such ship-shape as will enable them to carry the mails most efficiently. Thus, whilst no doubt as the years go on the British government will find reasons for encouraging by means of subsidies direct steamship lines between British ports and various colonies, yet anything in the nature of a general subsidy for the encouragement of ship building and shipping enterprise is entirely out of the question. The Imperial Steamship Line, plying between Jamaica and Bristol, is subsidized to the extent of £40,000 a year, £20,000 by the British West Indies and £20,000 by the Imperial government. Here is a distinct political object, namely, the strengthening of the commercial bonds between the West Indies and Great Britain. The assumption here is that economically the West Indies are drifting nearer to the United States and further from Great Britain, and this attempt at improved maritime transport is meant to counteract that influence. Shippers generally might argue that they are entitled to subsidies on the same lines, because wherever their ships go they undoubtedly strengthen the commercial influence, and therefor the political influence of this country. But a line must be drawn somewhere, and my impression is that the West Indian experiment will prove to be a deterrent rather than an encouragement in any policy of subsidies. It must be recognized further that the ship owners themselves are by no means agreed. For example, Sir Christopher Furness, who now looms out in the shipping world as a very big figure, is resolutely opposed to any policy of subsidies. Again, A. Chivas Adam, the chairman of the General Shipowners' Society, recognizes clearly enough the impossibility of any general subsidizing policy. The main feature of the evidence he gave before the subsidies committee was to the effect that the British mercantile fleet is too vast to subsidize, and that, as without state aid it has gained the foremost position, they still hope to keep that position as chief carriers of the world's traffic without state aid. I suspect he had also in his mind that state intervention and control must come sooner or later as a natural sequel to state subsidies. Certainly, if I were the head of a maritime department of the British or any other government, and in my official capacity I had to subsidize ships galore, I should have no hesitation in claiming a considerable degree of control in the management. The fact is the British ship owners know perfectly well that they themselves must pay for the subsidies either in meal or malt. They therefore prefer to pay cash down and be their own masters. They look, indeed, in quite other directions for economic easement. Thus, A. Chivas Adam states unhesitatingly that, while disclaiming the expectation of bounties, the shipping trade should be relieved from such dues as for light-houses, and further suggested to the government some such clause as this:

"That unless foreign countries, e. g., America, Russia and France, which at present restrict their coasting trade to vessels of their own flag, would consent to throw open their respective coasting trades to British vessels upon the same terms as those of vessels of their own flag, it would be desirable for the British government to ascertain whether the British colonies would be willing to consent that all inter-colonial trade, and also the trade between Great Britain and her colonies and dependencies throughout the world, should be regarded as 'coastwise trade,' and, as such, be limited to vessels belonging to Great Britain and her colonies."

That suggestion is clever, but insidious. It is, of course, not in any sense of the word a subsidy, but very distinctly it is an attempt at commercial protection, striking at the root of the recognized British policy of free trade.

Shipping Disabilities.

The real aim, of course, of ship owners is the removal of disabilities which are to be found, as a matter of fact, far more in our colonies than in our own ports. Endless difficulties obtain in the port of London on account of its fearfully disorganized condition, but the report of the royal commission on the port of London leads to the expectation that a trust will soon be formed, thus consolidating the various dock authorities into one body and adopting urgent improvements for bringing the port up to a higher level of efficiency. The presence in England at the present moment of the colonial prime ministers has been utilized by ship owners to impress upon colonial opinion British ship owners' grievances against the colonial governments. For example, the commonwealth of Australia forces shipping masters to enter into a bond at Australian custom houses to pay a fine of $500 for each member of the crew who may desert, or for any reason may not leave in the vessel which brought him. This is a peculiarly onerous condition because ships may lie in harbor for a month or more, and captains cannot lock up their men or control their movements by force. Not long ago a case was reported where a steamer was fined £600 ($3,000) for this offence. Thus Australia not only gained the money, but received into its expansive bosom six men who thus helped to increase its all too scanty population. Again, the Australian commonwealth makes assessment for income tax in an arbitrary and, in many cases, an oppressive way. The cargoes which British ships carry to Australia are officially valued and are then assessed for income tax for the profits which they may be expected to earn. Thus, the ship owner pays income tax to the Australian commonwealth upon an assessment against which he has no appeal, and then pays a second income tax in Great Britain. Again, another grievance is the rigidity of the customs regulations in Australia, particularly when ships in Australian ports proceed to another Australian port. Seals are put on a vessel's stores which are almost without exception taxable and nothing can be consumed unless the duty is paid upon it. The peculiar advantage of this regulation to the Australian revenues is out of all proportion to the friction which is caused between customs-house officials and ship masters. Litigation is frequent and both foreign and British owners have repeatedly protested. It is obviously a piece of official pedantry. Coming nearer home, there is a good deal of special legislation which hits the ship owners more or less severely. Thus James, Dixon, a prominent member of the General Shipowners' Society, has recently observed that the British government for many years has been unsympathetic to the shipping interest. He ascribes it to the Plimsoll agitation of twenty-five years ago, and subsequent legislation of a harassing character. Yet with all these disabilities, British ship owners manage very successfully to keep the wolf from the door, and I am at any time willing to take over the possession of their ships when they are tired of them. I could put up with legislation on present day profits.

Shipping Profits.

A propos of profits, the Anchor Line (Henderson Bros., Ltd.) although they have had more prosperous years, have not done badly with a profit, after deducting all expenses and charges, of nearly $650,000. After writing off depreciation, they pay a dividend of 5 per cent. on the ordinary shares, and carry forward $170,000. In addition, their reserve fund stands at $500,000. At the annual meeting of this company, the chairman was asked what effect the Pierpont Morgan combination would have on the company's business. He replied that, so far as could be seen at present, the effect of a combination of American capitalists engaged in the Atlantic trade was not likely to be injurious to the company. Then there is the Ellerman Line, Ltd., who only report five months' trading. J. R. Ellerman, the head of this company, is very well known in all shipping circles, and has brought off some great *coups* in his time. This company is really a combine. It started last July with no intention of investing the bulk of its capital in shipping enterprises, and the greater part of its money was for some time invested in stock exchange securities. The rest of the story may as well be told in the following *resume* of the speech delivered by J. R. Ellerman to his shareholders:

An opportunity arose for purchasing the well-known and prosperous City Line. By arrangement between the company and himself it was agreed that the purchase should be made as to half for the company and half for himself, and the City Line was so acquired. Later on the Hall Line was bought on the same basis, the company having previously acquired two steamships with funds at their disposal. This arrangement with regard to a dual interest was found, at the latter part of last year, not to be easily workable and, much to his subsequent regret, he assented to his interests being merged with those of the company, on terms agreed to by the shareholders. Having alluded to the purchases by the company of the Westcott & Laurance Line and the London and Oporto service of Messrs. Palgrave, Murphy & Co., he said that, including the four new steamships now building, they had a fleet of seventy-five vessels, with a gross tonnage of nearly 240,000 tons, so that their fleet was about the seventh, in point of size, in the United Kingdom. He defended the conference arrangements between the different shipping companies engaged in the same trades, and said that shippers and merchants as a body preferred a regular and common basis of freight by which they were enabled to carry on their business without the risk of serious fluctuations being made from week to week. It was also, as a result of such arrangements, that ship owners were able to give a punctual service by sailing their ships whether they were full or not. To show that there was no undue advantage gained by steamship companies working under the conference arrangements, he pointed out that the Union Castle Co. paid only 6 per cent. for 1899 and 1900, and 5 per cent. in respect of 1901 on their share capital, in spite of the fact that a large proportion of their total capital carried a much lower rate of interest. In other

trades worked on these lines the profit was equally small, and one company—the China Mutual Steamship Co.—had recently been glad to sell their business to competitors for less than the par value of their shares. Turning to the accounts, he observed that the profits disclosed were largely derived from interest on investments, but they included the dividends from subsidiary companies to Dec. 31 last. With the profits of the five months, the board were enabled to extinguish the whole of the preliminary expenses, £4,000, to pay half-yearly dividends at the rate of 4½ per cent. per annum on the preference shares, and at the rate of 10 per cent. on the ordinary shares. Since then the directors had had before them the approximate result of the first six months' working of the current year, and, although shipping was now in a depressed condition, it permitted of the declaration for that period of interim dividends at the rate of 4½ per cent. on the preference and 8 per cent. on the ordinary shares. It is not easy to imagine J. R. Ellerman going to the British government with a long face asking for subsidies and bemoaning his cruel fate.

River St. Lawrence and Marine Insurance.

This week in the committee room at Lloyd's, Sir William Mulock postmaster general of Canada, Mr. Fielding, minister of marine and Mr. McFie, president of the Montreal board of trade, met the committee and some of the leading underwriters to put before them the disabilities which Canada lies under in the matter of marine insurance rates compared with the United States. The Canadian representatives showed that the present lights and buoys were being improved and others were being added in positions where the navigation was dangerous. The Marconi apparatus will be erected on various headlands, and it is hoped that steamers will be equipped with similar appliances. They asked for the co-operation of underwriters, and said that they would gladly welcome any suggestion for improving further the navigation of the St. Lawrence. The underwriters expressed their desire to meet the wishes of their Canadian fellow-subjects to the utmost of their power. They pointed out, however, that they were business men, working for a profit, and that, so far, not only had no profit been obtained, but a considerable loss, especially when it was remembered that, the navigation being open only for six months in the year, they received only six months' premium each year on all the losses and casualties that had befallen them. If the deputation would send them facts and figures as to the number of steamers sailing to and from the St. Lawrence and also a list of the losses and casualties, the underwriters would see if they were able to modify their rates. This question of the dangers of the St. Lawrence is specially important now that proposals are before the government for subsidized Canadian-British lines.

Going to Find Out.

It is stated, *ore rotundo,* that Lord Charles Beresford is going to America in the autumn to study the United States navy and enquire into the working of the Atlantic shipping trust. Lord Charles is a cheery individual, and we all like him, but when it comes to accepting his opinion, most of us prefer the genuine expert. Still, I don't doubt that when he comes back, effulgent in glory, he will tell us two or three things which are both true and unpalatable. A few years ago, when he went to China, Sir Henry Campbell-Bannerman, the leader of the Liberal party in the house of commons, rising with a solemn face, asked Mr. Balfour, the leader of the house, whether Lord Charles Beresford had gone to China as an official ambassador or was he merely a commercial traveller? The humor of the remark certainly tickled the fancy of those who know the cheery Irish sailor.

The Atlantic Shipping Trade.

For the convenience of your readers who have not seen the article in the Paris Figaro for July 28, by Pierre Baudin, who was minister of public works in the last French government, I subjoin in English the following paragraph which is the conclusion of the article:

"The German-American trust favors German but diminishes the importance of British shipping. French ships are entirely ignored by it. It places our ports within the sphere of its operations. True, it thus reserves for us the same fate as it does for Holland, Belgium, Spain, and Italy. But our geographical situation should have insured us in face of this trust a very different rank. Economic reasons must have determined it to leave us out. The occasion should be a decisive one for meditation as to our own situation, and we shall thus obtain light on other matters besides our commercial power. The formation of the great trust inaugurates a new mode of political relations between peoples We have here a power which arranges treaties of the same scope as those drawn up by the ancient foreign offices, but which proceeds in quite another fashion. The trust deprives England of an important portion of her naval power and places it under the flag of the United States, which will naturally utilize it in the event of war. As for us, it deprives us of nothing; but in the treaty with Germany it provides for the case of war between Germany and the United States, Germany and England, and England and the United States, and stipulates that the contract shall then cease to be in force. In all other cases every one of its stipulations subsists—notably that which obliges each contracting party to put at the other's disposal 'the supplementary vessels that it may need for its traffic.' In the case of a conflict between France and Germany, would the German companies hold as being covered by the word 'traffic' the exceptional transports which their government would call upon them to insure? This is a question which one ought not to be obliged to put considering the status and responsibilities of neutrals, not to speak of international convenances. But the terms of the contract which has provided for the contingency of war between two of the three nations seem restrictive. It is impossible to read and analyze the document signed by Mr. Pierpont Morgan and the two German managers without feeling anxiety. How will diplomacy be able to deal with an association which soars so audaciously above the general conditions of the relations between peoples? This business contract would seem to be a treaty signed by ambassadors and drawn up by a notary. And from this singular contrast may be deduced the most striking affirmation of this new principle, dear to Americans—namely, that the political value of a people results from its economic power."

A propos of the Atlantic shipping trade, a correspondent calls attention to the efforts of the late James Huddart to bring about a fast steamship service between Canada and Great Britain. James Huddart, who attended the Ottawa conference of 1894 by the invitation of the Dominion government, and had the full sympathy of the Canadian Pacific railway proposed a weekly service of steamers maintaining a 20-knot speed in normal conditions, acting as large passenger carriers and fitted at the same time with refrigerating machinery for the conveyance of first-class perishable goods. The Canadian parliament having sanctioned a subsidy of £150,000 per annum for ten years, James Huddart asked the British government for a subsidy of £75,000 per annum for ten years to make his project practicable. Tenders having been publicly called for in 1806, a lower tender than James Huddart's was taken; in June 1898, however, this enterprise was announced as having failed.

Important Marine Law Case.

A case has just been up in the appeal court, technically known as the Steamship Carisbrook Co. vs the London and Provincial Marine & General Insurance Co. It was an appeal from the judgment of a judge of the lower court, in which action was brought by the ship owners against the underwriters on a policy of marine insurance on the hull and machinery of the steamship Yestor. The question was whether the defendants were entitled to have a deduction made from the plaintiffs' claim in respect of the liability of the plaintiffs as owners of chartered freight to make contribution in general average. By a charter party, dated Sept. 11, 1900, the Yestor was chartered by the plaintiffs, her owners, to proceed from Fleetwood to Savannah, and there load from her charterers a cargo of cotton, and, being so loaded, to proceed to certain specified ports of discharge and there deliver her cargo on being paid freight. Under the charter party the charterers had the option of loading a cargo of coal for the outward voyage, but none was loaded, and the vessel sailed in ballast from Fleetwood on Sept. 13. In the course of the voyage, and before arrival at Savannah, the vessel grounded and sustained damage to her propeller and other injuries by reason of working her engines in getting her off. She subsequently proceeded to Savannah and loaded a cargo under the charter party in respect of which the charter party freight was earned. It was admitted that the damage to the propeller and the other injuries were of the character of a general average sacrifice The defendants contended that, upon a proper adjustment of the general average loss claimed the plaintiffs were liable to make contribution in respect of the freight under the charter party. Mr. Justice Mathew held that the homeward chartered freight was liable to contribute in general average. The plaintiffs appealed. The ship owners sought to prove that the outward voyage was for all purposes of general average no part of the adventure, and that therefore the homeward freight should not enter into the average. The court, however, decided in favor of the underwriters. This ruling, therefore, means that in a case where the ship owners are owners of the freight as well as owners of the hull, and by charter party undertake a round voyage for a specific purpose mentioned in the charter, all the chartered freight earned by the plaintiffs from start to finish must become subject matter of a general average contribution. The case excited considerable noise in shipping circles, but the judgment was not unexpected, inasmuch as the principle enunciated by the judges has been adopted by average adjusters as far back as 1810.

A New Graving Dock and a New Cunarder.

This week there was launched from the ship building yard of C. S. Swan & Hunter, Ltd., Wallsend-on-Tyne, a large new graving dock, built for the government of Natal. This dock is part of a scheme of port reorganization for Durban. It is of the same type as the government floating dock at Bermuda, with a lifting power of 4,500 tons. Its extreme length is 365 ft.; width, 87 ft.; and the distance between the guard timbers at the side walls is 66 ft.; so that the dock can accommodate vessels of 60 ft. beam; and, whilst still retaining a freeboard of 4 ft. it can dock vessels drawing 18 ft. over keel blocks 4 ft. high. The dock proper consists of three pontoons, and the side walls of each pontoon are connected by means of moveable joints, so that any of the pontoons can, when required, be removed and lifted by the dock itself, thus making it self-docking in all its parts. The machinery is contained in the upper portion of the side walls, and consists of two separate but identical installations. Each installation comprises a boiler and two pumps, each pump driven by its own separate engine; and the piping arrangements of the

dock are so arranged that every pump can empty the whole of the compartments on its side of the dock. In addition there is a communication across the dock, so that, in case of breakdown, it would still be possible to lift the dock by the engines on one side alone. The dock has forty water-tight compartments, each of which has a separate pipe leading into it, each pipe being provided with a separate valve. All these distributing pipes are connected together into the main drain on which the pumps are seated, and the discharge from and inlets into this main drain are governed by large screw-down valves, and by automatic flap-valves outside the dock. The different compartments are all worked by means of bellcranks and rods and levers from the valve-house, which is placed centrally on each wall, whence direct communication can be made to the engines and the inlet and outlet valves, so that the valveman sitting in the house has complete control over the whole of his section of the dock. There is an electric light installation, so that work in the dock may be carried on by night as well as by day. The dock, after undergoing her lifting trials, will proceed to Durban, where it is due after the end of the current year.

At the same time was launched a new Cunarder, passenger, to be called the Carpathia, the vessel to ply between Liverpool and Boston. She will have accommodation for 200 saloon and about 600 third-class passengers. She is 558 ft. long, her depth molded to the upper deck is 40 ft. 6in., and to the shelter deck 48 ft. 6 in. Her breadth is 64 ft. 3 in., and her gross tonnage is 12,900. Her speed will be 15½ knots on trial. There are four steel decks, the bridge deck being 290 ft. long. The Carpathia will be driven by two independent sets of quadruple-expansion engines, with cylinders of 26 in., 37 in., 53 in., and 76 in. diameter, and a stroke of 54 in. Steam will be supplied from seven single-ended boilers at a pressure of 210 lb. to the square inch. The vessel will be fitted with chilling chambers for carrying meat.

NEW SHIPS TO FOREIGN BUYERS.

During the month of July new ships sent to foreign buyers were valued at £504,006, an increase of £6,032 on July 1901 and of £45,911 on July 1900. For the first seven months of the year, however, the total value is £3,557,262, being a decrease of £1,914,282 compared with the first seven months of last year, and £840,946 on the first seven months of the year 1900. The details both for last month and the first seven months of the year in number, tonnage and value are herewith appended:

Warships, (including machinery and armament), six; tonnage, 8,939; value, £588,000.

Steamships, other than for war, (including machinery), 121; gross tonnage, 168,807; value, £2,801,507.

Sailing ships, other than for war sixty-three; gross tonnage, 13,672; value, £147,095.

Boats, 282; gross tonnage, 1,703; value, £20,660.

Total, 472 vessels; gross tonnage, 193,121; value, £3,557,262.

NAVAL STRENGTH OF UNITED STATES AND GERMANY

Building by the navy at the different private yards is the subject of a detailed report just presented to Rear Admiral A. T. Bowles, chief constructor of the navy. The report is based on the latest information from the superintending constructors. The program of heavy vessels seems small compared to that of Germany scheduled to be completed in 1907. Comparisons of the strength, present and prospective, of the German and American navies are usually based on the number of ships Germany has built or building without making allowances for the number the United States may authorize and complete by the time Germany's program is completed. For this reason nothing more than an approximate idea can be obtained of the relative strength of the two services five years hence. At present, according to the report just issued, the United States has building eight first-class battleships and two more will be under way within a few months, making ten new vessels of that type which should be in commission by 1905. These added to those now in service would give the navy a battleship strength of nearly twenty. Should congress in the next two years follow its policy of appropriating for two battleships annually, the strength of the navy in battleships by 1907 will be close to twenty-five. Germany will have about an equal number in that time, none of which, however, will be the equal in fighting force to several of the leviathans now under construction by this government.

Next in point of effectiveness in battle is the armored cruiser type, of which two are in commission and six are now building. Here Germany surpasses the United States in number, although not in power. Triple screws are distinctive features of her new battleships and armored cruisers, while the United States adheres to the twin-screw design. Of the battleships building one, the Maine, is 92 per cent. completed and will join the home station next autumn in time for the winter manoeuvers. Next approaching her in rate of progress is the Missouri, 68 per cent. completed, while a sister ship, the Ohio, is 61 per cent. completed. These three vessels are of 18 knots and in classes by themselves. Five others of 19 knots have made little progress, and none of these will be ready for service in less than two years. These are the Virginia, the Nebraska, the Georgia, the New Jersey and the Rhode Island, of which the last three are about 12 per cent. completed.

Greater relative progress will be shown upon them in the next six months. The armored cruisers, comprising the Pennsylvania, the West Virginia, the California, the Colorado, the Maryland and the South Dakota, are from 7 to 32 per cent. completed and progressing satisfactory. These ships were contracted for at the same time the battleship bids were awarded.

In the protected cruiser class this government is perhaps stronger, including ships under construction, than Germany. A large number are now at sea and nine are building, of which six are of 17 knots speed and three of 22 knots, the latter being improved Olympias. The smaller ships are so well along that all will be ready for service next year. The others will not be commissioned in less than eighteen months. The remaining ships building are so near completion that a majority will join the fleets this year, if crews can be provided, and the rest will be ready for service early next winter. The list includes four 12-knot monitors—98, 94, 93 and 91 per cent., respectively, completed. They could all be sent to sea next autumn if needed. As it is, they probably will not be commissioned before January. The remainder of the navy's program of increase comprises eleven destroyers, seven submarine and seven torpedo boats, every one of which will be ready for the fleet work next autumn. The entire torpedo boat program and probably all of the seven submarine boats will be completed within a few months.

The close of the year will witness only the larger type of shipbuiding for the navy. To this building program should be added two 16,000-ton battleships, two 14,500-ton armored cruisers and two 1,100-ton gunboats, for which contracts will be awarded in October. The next congress is expected to adhere to the policy of the last few years and authorize two battleships, two armored cruisers and some smaller ships.

IRON ORE OF BELL ISLAND

A writer in the Monetary Times who has just visited Nova Scotia gives the following interesting description of the iron mines of Bell island. They are undoubtedly unlike iron mines in any other part of the world. He says:

"Bell island is situated in Conception bay, about four miles from the mainland and nearly fourteen due north of the city of St. John's. The strangest feature about the island is that it is so entirely different in structure both from the other islands and from the nearby mainland, which are barren alike of soil and minerals. The island measures about six miles from east to west, and is about three miles broad. Roughly speaking, if you were to bisect it with a line running lengthwise, the iron deposits would all be contained in the northern half, but as any vessels lying at anchor on that side would be exposed to the full force of the Atlantic in case of rough weather, the piers of both companies have been built on the south shore, and the ore is brought across in trucks. This is done in rather an ingenious way, with a sort of endless cable which runs on rollers between the rails of the track, the trucks being fitted, front and back, with a patent clamp by which they can be readily fastened to it. On reaching the piers, the trucks are cast off and run into a sort of cage, the invention of Mr. Chambers, the engineer in charge of the Nova Scotia Steel Co.'s mine. By working a lever the whole thing is swung round until the cars are suspended bottom upwards, and immediately the ore is out the cage rights itself apparently without so much as a finger being moved. The weight must indeed be finely adjusted to make this possible. The immense bins in which the ore is dumped are emptied through a sort of trap door in the bottom, under which an endless stream of buckets is passing. From these the ore goes into a slide and on to the hold of the vessel. The buckets hold half a ton of ore each and empty at the rate of fifty per minute, so that, allowing for short delays in shifting the vessel, a steamer holding 4,500 tons of ore can be loaded in a little over three hours. The Dominion Iron & Steel Co.'s ore all goes to Sydney, that of the Nova Scotia Steel Co. to Ardrossan (Scotland), Rotterdam and Philadelphia.

"From the piers we went into the mines, which are indeed well worth a visit. Probably nowhere else in the world can mining be conducted with the same ease, the total cost of putting the ore on board ship being only 23 to 30 cents per ton. The ore is practically all on the surface, and is of a peculiar formation, not unlike slate. When blasted it breaks into very small pieces, scarcely any of them larger than an ordinary brick, and a good deal of it almost as fine as gravel. It is, however, of a low grade, containing only 55 per cent. of iron. The island was originally owned by a local company from whom it was purchased about five years ago by the Nova Scotia Steel Co. The price is understood to have been $125,000. The new company spent in the neighborhood of half a million in improvements, built a wharf and a track across the island, and finally sold out to the Dominion Iron & Steel Co. some three years ago for, it is said, $1,000,000, reserving, however the upper seam for themselves. They have now a new wharf erected, and a separate track across the island. Altogether the two companies have about 1,000 men employed, and there is work for about 300 more if they could be secured. At present the men are working overtime and at 12 cents an hour are making $1.68 per day, no bad wage for a laboring man. When one considers that it is only about six years since the whole island was a wilderness, its development has indeed been remarkable."

COKE PRODUCTION DURING 1901.

The domestic manufacture of coke in 1901 is discussed by Edward W. Parker in "Mineral Resources of the United States," now in press for the United States geological survey. Including the output from by-product ovens, the total coke production of the United States in 1901 amounted to 21,795,883 short tons, valued at $44,445,923, as compared with 20,533,348 short tons, valued at $47,443,331, in 1900, and with 19,668,568 short tons, valued at $34,670,417, in 1899. The increase in production in 1901 as compared with the preceding year was 1,262,535 short tons, or 6.15 per cent. The value of the product, however, showed a decrease of $2,997,408, or 6.3 per cent. Although the extraordinary demand for coke, which developed in 1899 and continued through 1900, was maintained throughout 1901, the average price per ton showed a decline from $2.31 in 1900 to $2.04 in 1901. This decline in price was a natural one, as during the spring of 1900 the prices were unusually high and raised the prices for that year to a figure nearly 15 per cent. higher than any year since 1880. Another cause of the decline in value in 1901 was the fact that the number of completed ovens increased from 58,484 in 1900 to 64,001 in 1901; the producers were better able also to supply the demand, and the increased facilities for transportation furnished by the railroads enabled them to market the product more readily.

The statistics of the geological survey during the last twenty-two years are the only reliable record of coke production in the United States. The census of 1850 reported four establishments making coke in the United States in that year; the census of 1860 reported twenty-one ovens; in 1870 twenty-five ovens were reported, but the production was not given separately; in 1880 the coke production amounted to 3,338,300 tons; in 1890 it had increased to 11,508,021 tons; in 1900 it had grown to 20,533,348, and in 1901 it reached the maximum production of 21,795,883 tons. This growth has been fairly regular. There were five years in the twenty-two in which the production was less than in the preceding year; the most noteworthy of these were the panic years of 1893 and 1894, and 1896, which was also a year of depression.

At the close of 1900 there were 5,804 new ovens in course of construction, of which 1,096 were by-product ovens; of the latter, however only eighty were completed during 1901, and the increased production last year was almost entirely from beehive ovens. At the close of 1901 there were 5,155 in course of construction, of which 1,533, or 30 per cent., were by-product ovens. The production of by-product coke increased from 1,075,727 short tons in 1900 to 1,179,900 short tons in 1901. The number of coke-making establishments as shown by the returns was 423 in 1901, as compared with 396 in 1900.

The states which showed the largest increases in production during 1901 were Pennsylvania, whose output increased 998,622 short tons, and Virginia, whose output gained 221,974 short tons. Other increases in production were unimportant. There were five states in which decreases were shown, the principal losses being sustained by West Virginia and Tennessee. Of the 423 establishments in existence on Dec. 31, 1901, fourteen having a total of 2,185 ovens did not begin operations until 1902, and fifty-three establishments having a total of 2,605 ovens did not produce any coke in 1901; that is to say, there were 356 establishments with a total of 61,396 ovens in active operation in 1901. In 1880 the number of ovens in existence was 12,372, and the total coke production was 3,338,300 short tons, an average of 270 short tons of coke per oven; in 1890 the total number of ovens had increased to 37,158, and the coke production to 11,508,021 short tons, an average of 310 tons of coke per oven. In 1901 the number of active ovens was 61,396, which produced 21,795,883 short tons, an average of 355 tons per oven. The 1,165 by-product ovens in operation in 1901 averaged 1,013 tons of coke each.

The amount of coal used in 1901 to produce the coke was 34,207,965 short tons, as compared with 32,113,543 short tons in 1900, an increase of 2,094,422 short tons. The value of this coal increased from $28,134,756 in 1900 to $31,378,631 in 1901, an increase of $3,243,875. From this it would appear that the cost to the coke producer of the coal used increased over $3,000,000, at the same time that the value of the resulting coke decreased $2,997,408.

Since 1898, inclusive, the five leading coke producing states have been in the order named—Pennsylvania, West Virginia, Alabama, Virginia and Colorado—and the value of the coal per ton of coke produced has been, respectively: Pennsylvania $1.283, West Virginia $1.112, Alabama $1.88, Virginia $1.335, and Colorado (including Utah) $1.156. The general average yield of coal in coke appears to be about 64 per cent. but it is doubtful if the true average yield of coal in coke throughout the United States exceeds 60 per cent. In Pennsylvania this percentage yield of coal in coke was 66 per cent.; in West Virginia it was 61.1 per cent.; in Alabama it was 55.8 per cent.; in Virginia it was 64.7 per cent., and in Colorado it was 58.4 per cent. The comparative yield in 1900 was for Pennsylvania 66 per cent., West Virginia 60.9 per cent., Alabama 58.9 per cent., Virginia 63.2 per cent., and Colorado 62 per cent.

In the manufacture of coke, the percentage of washed coal used has nearly trebled since 1890, when it was about 7 per cent. of the total of 1901, when the washed coal was about 17.6 per cent. of all the coal consumed. The amount of unwashed run-of-mine coal increased from 21,062,090 short tons in 1900 to 23,751,468 short tons in 1901. The washed run-of-mine coal increased from 1,369,698 short tons in 1900 to 1,600,714 short tons in 1901. The use of unwashed slack coal fell off over 1,130,000 tons from 5,677,000 short tons in 1900 to 4,546,201 short tons in 1901; and the washed slack coal increased from 4,004,749 short tons to 4,309,582 short tons in 1901. In Pennsylvania in 1901 the amount of the unwashed run-of-mine coal used exceeded that of the preceding year by about 2,000,000 tons; the amount of washed run-of-mine used was about the same in both years; the amount of unwashed slacked coal decreased over 400,000 tons, and the amount of washed slack fell off about 100,000 tons. West Virginia coke producers depend principally upon slack coal for their ovens, about eighty per cent. of the coal used being of this nature and most of it being unwashed. In Alabama washed run-of-mine coal used in 1901 was more than three times that of the preceding year, and the use of the washed slack increased a little over 10 per cent. In Virginia all of the coal used is unwashed; about 60 per cent. of this is run-of-mine and about 40 per cent. slack. In Colorado the tendency to wash the coal before coking, particularly the slack, shows a decided increase and shows a corresponding falling off in the amount of unwashed slack used.

Of the 1533 by-product ovens in course of construction on Dec. 31, 1901, 1,011 ovens were reported as in course of construction at the close of the preceding year, a net increase of 522 new ovens begun in 1901 and not completed during that year. In 1893 twelve by-product ovens produced 12,850 short tons of coke; in 1897 280 ovens produced 261,012 short tons, and, as already stated, 1,165 ovens produced 1,179,000 short tons in 1901. Of these 1,165 by-product ovens 595, or a little more than half, were operated in connection with iron and steel plants. Of the 1,533 ovens completed in 1901, 1,176 will be directly associated with blast furnaces or steel plants. The total value of the coke produced by the by-product ovens in 1901 amounted to $2,894,077. The value of the tar-sulphate of ammonia and ammoniacal liquor produced by these ovens in 1901 was $1,029,876, equivalent to 35 per cent of the value of the coke produced. Assuming that the ammonia and tar products average approximately the same for the whole United States, and estimating the values at the price obtained throughout 1901, the loss in the value of these products which were wasted in making coke in beehive ovens in 1901 alone may be estimated at between $9,000,000 and $10,000,000. There is always a good demand for ammonia and ammonia liquor at remunerative prices. These products in 1901 furnished more than two-thirds of the total value of the by-products used, exclusive of the gas. At most establishments no account whatever is taken of the gas produced; it may be estimated, however, at about twelve thousand million cubic feet in 1901, which at 25 cents per thousand cubic feet would be worth $3,000,000. It can thus be readily seen that even at much lower prices the value of the by-products really exceeds that of the coke produced. The late Joseph D. Weeks in the course of investigation into by-product coke making in Germany ascertained that in some instances the by-products paid all the cost of coal mining, coke making, depreciation of plant, etc., and that the resulting coke was absolutely net profit to the producer.

The value of the coal tar products imported in the United States in 1900, principally from Germany, was $6,139,550, upon which $1,300,901 duty was paid a total cost, exclusive of freight, of $7,440,460. The values are for the products at the point of shipment. Freight charges, insurance, profit of middle men, etc., being added, it can readily be seen that the actual cost to the consumer of coal tar products is between $10,000,000 and $12,000,000 annually. The coke imported in the United States in 1901 amounted to 72,727 short tons, valued at $266,075, 42,820 tons less than in 1900; and the exports amounted to 430,450 short tons, valued at $1,156,898—8,211 tons more than in 1900.

Alabama ranks third among the coke-producing states, and the coke produced in Alabama in 1901 amounted to 2,148,911 short tons, as compared with 2,110,837 short tons in 1900, a gain of 38,074 short tons or 1.8 per cent. The increase of 1900 over 1899 was 323,028 short tons, or 18 per cent. The value of the coke produced in 1900 was $1,994,952, a gain of 55 per cent. over 1899; in 1900 the value of the coke showed an increase of $433,193, or about 8 per cent. The coke product of Alabama in 1901 was almost double that of 1890, and more than thirty-five times that of 1880. Colorado (including Utah) holds the relative position west of the Mississippi river as a coke producing state that Pennsylvania holds in the United States, and although its production of coke has not reached as high as 1,000,000 tons in any year it ranks fifth among the coke producing states. The production in 1901 was 671,303 short tons, an increase of 52,548 tons, of 8.5 per cent. over that of the preceding year. The value of the coke produced declined from $1,746,732 in 1900 to $1,626,279 in 1901, a net loss of $120,453. In 1880 there was only one plant in operation with a total of 200 ovens; in 1890 the number of establishments had increased to eight, and the number of ovens to 916 and the production had increased about ten times. Pennsylvania holds an even higher relative position as a coke producer than as a coal producer. The state is credited with

about 55 per cent. of the total coal product of the United States; as a coke producer it contributes from 65 to 70 per cent. of the total product. Moreover, 75 per cent. of the entire increase in coke production in 1901 as compared with 1900 was made by Pennsylvania. The coke production of the state in 1901 amounted to 14,355,917 short tons, valued at $27,066,361, as compared with 13,357,295 short tons, valued at $29,692,258 in 1900; this indicates an increase of 998,622 short tons or 7.4 per cent. in production, and a decrease in value of $2,625,897, the average price per ton declining from $2.22 in 1900 to $1.885 in 1901. The Connellsville region was responsible for the principal decline in value, for with an increase of about 200,000 tons in quantity the value fell off over $3,000,000. In this, the most important coke producing region in the state, the average price of Connellsville coke declined from $2.23 in 1900 to $1.873 in 1901, the average price for Connellsville coke being less than the general average for the state. The increase in the coke production in Virginia during 1901 as compared with 1900 was larger than that of any other state in the union, except that of Pennsylvania. In the percentage of it exceeded all other states with the exception of Ohio and Washington, but in both of these states the amount of production was comparatively small. Virginia's production in 1901 amounted to 907,130 short tons, as compared with 685,156 short tons in 1900, an increase of 221,974 tons, or 32.4 per cent. Notwithstanding the large increase in production the value of the product in 1901 exceeded that of the preceding year by only $19,114, the average price having declined $2,137. As in the two preceding years, the increases in production were from the active developments which had been carried on in Wise county, along the Clinton river division of the Norfolk & Western railroad. West Virginia ranks second among the coke producing states, although its total production in 1901 was only about 16 per cent. of that of Pennsylvania. It is one of the five states in which the production last year was less than that of 1900, although the decrease was comparatively small. The total production in 1001 was 2,283,700 short tons, a decrease of 74,799 short tons or 3.17 per cent., as compared with the output of 1900. The value declined $636,622; the decrease in production in 1901 was one of three instances in which the coke output of West Virginia in any year has been less than that of the preceding year.

EXPERIMENTS IN WIRELESS TELEGRAPHY.

The first meeting of the board appointed by the navy department to witness the wireless telegraph tests and to decide upon the system to be installed in the United States navy, was held in Washington last week. Several tests were made between Washington and Annapolis, the result of which was not given out. The navy department purchased abroad duplicate sets of appliances from Octave Rochefort and these are now installed at the navy yard in Washington and at the Annapolis academy. Another duplicate set was purchased from Ducretet of Paris. Admiral Bradford believes that the system to be adopted should be bought outright by the department. The Marconi system is not being considered by the board for the reason that Marconi will not sell outright. Admiral Bradford is giving much attention to the subject of wireless telegraphy and during the present week made the following statement regarding it:

"Wireless telegraphy is exciting much attention. Its field of usefulness is essentially on the sea. It is doubtful if it will be of much service on land, where aerial telegraph lines can be established. Ships of all continental navies are being supplied with wireless telegraph apparatus; also, to some extent, those of the small navies of South American countries. The apparatus is by no means perfect. It will not work in very hot weather; why, is not fully known. After the heat of the day is past, however, messages are transmitted without difficulty. Messages can be sent during fog and bad weather. As a matter of fact the transmission of messages is facilitated by the presence of fog. Cold weather does not seem to interfere with its use. Communication, however, is as a rule entirely interrupted during the prevalence of thunder storms. When the transmitting apparatus at a wireless station is in operation no other transmitting apparatus within its radius of effect can be used without conflicting with the message being sent by the first mentioned and rendering it entirely unintelligible. This quality is known as 'interference,' and is, of course, a very great drawback. It is claimed by some makers that the difficulty of 'interference' may be overcome by tuning the apparatus used so as to create a certain syntony of waves. I do not believe, however, that any practical appliances accomplishing this result have been devised.

"It will be readily understood what a great advantage this system is at sea, as it enables a ship to report her location and conditon or ask for assistance from other ships many miles away (probably at least sixty to 100) without difficulty. Messages can be transmitted over the sea with much more facility than over the land, and probably about twice as far. The range of this apparatus for intelligible signals is at present unknown. It is being increased by the use of more powerful appliances.

"Another illustration may be made of its military value. For instance, suppose a flagship is anchored in Havana harbor, with lookout vessels stretched across Florida channel or across the Yucatan channel or the entrance to the Gulf of Mexico or all three combined, she may then receive reports at will of any suspicious circumstance, the approach of a hostile fleet or any other information necessary for effective action. Perhaps I may convey a general knowledge of the principles involved in the use of wireless telegraph apparatus. It is based entirely upon the ability of an operator, with a certain delicate apparatus, to detect the arrival of the so-called Hertzian waves, or electric pulsations, which are radiated in all directions with the velocity of light on the discharge of an ordinary electric spark. These waves may perhaps be best conceived by referring to the effect of throwing a stone into the center of a placid and quiet pool. Just how far they travel is unknown; it probably depends somewhat upon the intensity of the electric spark; in fact, this has been fairly well demonstrated. We are not so much interested, however, in the journeys of these waves as in the distance from the operator at which we can detect their presence. It is also a fairly well established fact that Hertzian waves follow the surface of the earth and are parallel to it. Suppose we now erect on the surface of the earth near the transmitting station a vertical wire or other good conductor of electricity; if insulated from the earth it may be utilized to transmit a current of electricity and discharge a spark into the air. For generating electric sparks the Rhumkoff coil is ordinarily used. This you will probably remember as an old laboratory friend. An ordinary voltaic battery is used in connection with the Rhumkoff coil. To obtain a greater distance of transmission, however, a dynamo is used instead of a voltaic battery, and a larger induction coil than the ordinary Rhumkoff type. In its simplest form the battery or dynamo is placed in the circuit of the primary of the induction coil, in which there is also placed an ordinary telegraph make-and-break circuit key. One pole of the secondary winding of the induction coil is connected with the ground, and the other pole is connected to the transmitting aerial wire, already alluded to.

"Let us pass to the receiving station. The essential instrument of the receiving apparatus is called a coherer. It consists of two metal plugs, or electrodes, separated a short distance from each other, about one thirty-second of an inch, placed in a glass tube or some other tube of insulating material, with the intervening space partially filled with loose metal filings, usually of steel, iron or nickel. It is also usual to have these filings semi-oxidized. This instrument was invented by Branly and not by Marconi, as popularly supposed. The metal filings in the condition described do not afford a sufficiently good conductor to permit an ordinary voltaic current to pass from one electrode to the other. When, however, a spark jumps across this small interval in the coherer the metal filings appear to arrange themselves in line from one electrode to the other sufficiently close to give good metallic contract, and thereby complete the circuit of a local battery already connected to the electrodes. It is plain that this local battery may be made to do certain work, such as operating an ordinary sounder or recorder.

"We must now establish a connection between the Hertzian wave coming from the distant station, and the spark which passes through the coherer, in order to establish a practical working apparatus. At the receiving station is an aerial wire, supported as at the transmitting station, sometimes, to multiply effect, a number of aerial wires are supported by masts, all of which wires are brought together before connection is made to the instrument; sometimes the length of the aerial wire is increasd to 400 or 500 ft. by means of a balloon. It is natural to suppose that the effect of the Hertzian waves will be increased in proportion to the number of conducting surfaces impeding their progress. It appears that when the wave arrives it creates in the wire a certain electric pulsation current or effect which, passing into the operating room is led through the primary of an induction coil and then to earth. It is a curious fact that the wire is more effective if, instead of being exactly vertical, it inclines to the vertical somewhat less than 45°. It will be remembered that at the transmitting station the poles of the secondary coil are practically connected, one to the earth and the other to the air. We now complete the circuit; the electric wave passes through the air, is caught by the vertical wire and goes to earth, doing certain work en route. That work is to excite the primary of an induction coil, which in turn excites the secondary winding of the coil connected directly to the electrodes of the coherer. This produces the effect described. The little break of one thirty-second of an inch is bridged over, the local battery comes in play and the sounder or recorder is brought into operation. There are certain transformers, condensers, etc., used to magnify this effect, which it is not necessary for us to discuss.

"The essential features of the apparatus have now been described with one exception. We have changed our coherer from a non-conducting instrument to one which readily conducts the current of the local battery; it therefore is not in condition to repeat the work already described, and it must be restored to its original status before the arrival of another Hertzian wave can be signaled. In the same circuit as the local battery is what is known as a 'tapper,' consisting of a hammer worked by an electromagnet which, every time the circuit is closed, gently taps the coherer in the center; this tap causes the metal filings to drop from the positions arranged by the sparks to irregular positions, thus breaking the circuit of the local battery. Another wave comes along, the act described is repeated, and this is kept up indefinitely. The operator by keeping his key down short and long intervals, causes the receipt of dots and dashes, and thus the signification of the waves is made complete."

OUR IRON AND STEEL INDUSTRIES.

Labor conditions in the iron and steel industries of the United States, in contrast with those in the United Kingdom and European countries generally, are discussed at great length by the commission appointed by the British Iron Trade Association which recently visited the United States and thoroughly studied its great iron and steel manufacturing establishments. This commission consisted of Mr. J. S. Jeans, whose name is already well known to the people of the United States as an authority upon these subjects; Mr. Axel Sahlin, an expert in blast furnace work; Mr. Ebenezer Parkes, whose special study was sheet and bar-mill practice; and Mr. Enoch James, who gave special attention to the steel industry; while Mr. Jeans' special work was to report upon the general economic and industrial conditions. The report of this commission, according to some extracts which have reached the treasury bureau of statistics, points out that in the United States the iron and steel industries are face to face with conditions that make both the dearest and cheapest labor at present to be found in the world—the dearest in point of nominal remuneration, and the cheapest in industrial and economic results. "The workmen at American mills," says Mr. James in his share of the report, "are generally supposed to be working much harded than they do in this country, (England) but this is not my own view. After much conversation with many men in various branches who had been employed in similar works in England, and some of them subject to my own control, the conclusion I have arrived at is that the American workmen do not work so hard as the men in England. They have to be attentive in guiding operations and quick in manipulating levers and similarly easy work. They are also more desirous of getting out large quantities than in England. They are better paid and more regular in their attendance at the works, loss of time through drinking habits or otherwise not being tolerated."

Mr. Sahlin in his section of the report says that the American workman generally aspires to the higher grades of labor, leaving the purely manual labor to workmen from other countries. "Thus it is," he says, "that around American blast furnaces the American is found in a very decided minority. He may be a foreman, master mechanic, blast engineer, locomotive driver, or stove tender, but he will not work eighty-four hours per week, shovelling ore or wheeling scrap. For these duties are employed in the south the negroes, and at the northern furnaces immigrants, mostly Irish, Slavs, or Italians." On this question of higher grade work and higher grade wages of American workmen, attention is called to the fact that in certain works Polish and Hungarian laborers were receiving $1 to $1.50 per day, while American rollers working alongside of them were receiving on the average $12 per day of eight hours. The report quotes Mr. Carnegie as stating recently that the average wages of men in his employment at Homestead was $3 per day, or an average of £187 per annum, against an average of £68 per annum as the earnings of iron and steel workers in Lancashire and £79 per annum received by the steel rollers in South Wales. On the question of cost of living, Mr. Jeans declares, as the result of his inquiries, that "the average American workman, in most of the essentials of life, can live, *mutatis mutandis*, as cheaply as he can in the old country."

The importance of the human factor," says the London Statist in summarizing this report, "is fully realized by all the members of the commission. It is all very well to admire American plant, the ingenuity of machine tools, the devices for saving labor, and so forth. But, as Mr. Sahlin remarks in his special report. "It is not the guns which win the battles but the men who stand behind them." What the American admires and honors is the ability to do; that capacity in a man, through his own sagacity, nerve, enterprise, and skill, to create and employ a fortune. Nobody is above his work. Everybody works, and for the sake of work, and thus has been produced in America within a generation an industrial potentiality more wonderful and more to be feared than all the factories and machinery and plants that these workers have created. It comes to this, then, that American labor is not more efficient, though it is better paid, than ours; and that American manufacturing development is due to the persistent, unresting industry which once characterised the Briton, but for which trade unionism and athletics have given an apparently growing distaste. All the reporters, however, seem struck with the strenuousness of American life. The comparative absence of a leisured class is noted as one of the prominent characteristics of the principal cities and industrial centers of the United States. In the avenues of industry a man without a regular business, or who is not concerned in the development of some industry is as a fish out of water. Nowhere, we are assured, is the struggling youth more kindly encouraged, more generously aided and more readily trusted than in America; and it is pleasant to read of an *esprit du corps* among the works' managers which one would hardly expect to find in a land of such feverish competition.

The Jackson & Sharp Co., Wilmington, Del., has received an order to construct six special car floats for the Pennsylvania Railroad Co. They will be 250 ft. in length, 35 ft. beam, and will have two sets of tracks for cars.

VIBRATION OF PROPELLER SHAFTS.

In view of the number of mysterious breakages of propeller shafts, under conditions in which it is evident that some other action than of the normal working stresses controlled, any systematic study of the possible causes of such disasters is to be welcomed. In a recent issue of the Zeitschrift des Vereines deutscher Ingenieure is given an account of the experimental researches made by Herr Frahm, for the purpose of examining the extent to which vibrations of propeller shafts actually occur, and to deduce the influence which such vibrations may have upon the reduction in strength of the shafts. The actual torsional stresses exerted upon the shaft by the engine in transmitting the power to the propeller can be accurately determined, and there is no difficulty in so proportioning the diameter of the shaft as to meet these with a large margin of safety. At the same time it must be remembered that a shaft of the length required to extend between the thrust baring of a marine engine and the hub of the propeller cannot be regarded as a rigid connection, but must rather be regarded as a torsional spring of more or less elasticity, operating under varying stresses.

If the propelling power originated in some uniformly acting machine, such as an electric motor or a steam turbine, the variation in the turning moments would be much less than with a reciprocating engine, in which the impulses of the steam upon the pistons act at successive intervals with a varying effect. These impulses must be transmitted to the propeller through the shaft, as an elastic connection, the result being the production of varying stresses almost impossible of numerical computation. If the action of the engine alone were to be considered, it might be possible to analyse the impulses and obtain data from which computations might be made. The varying resistances of the propeller, however, are practically impossible of determination, including as they do the action of the waves and currents, as well as the propelling reactions against the water. It therefore becomes necessary to resort to experimental investigations, and the methods and apparatus devised for this purpose by Herr Frahm are both interesting and instructive.

The principle involved in the investigations consisted in the recording of the amount of torsional distortion existing between two points on widely separated portions of the shaft at uniform time intervals during a revolution. This information has been obtained by the following apparatus. Upon the rims of two of the flange couplings of the shaft were placed bands of thin sheet zinc, forming smooth metallic drums upon which record markings could be made by means of platinum contact points. By taking one flange immediately next to the thrust bearing and the other at the extreme end of the tunnel, close to the hub of the propeller, nearly the whole length of the shaft was put under observation. By means of an electric contact apparatus the two platinum points were put into simultaneous contact with the zinc drums at uniform time intervals, and a comparison of the records gave an accurate measure of the torsional vibrations existing in the length of shaft under consideration.

An examination of reproductions of such records, as given in Herr Frahm's paper, while interesting, does not give such an instructive idea of the action as is indicated by the same results when transformed into wave diagrams plotted in connection with the turning moments on the shaft. Such translated diagrams show very clearly the continual vibrations to which the shaft is subject, and it is apparent that such action must result in the production of severe internal stresses. Herr Frahm gives the results of examinations of the shafts of several large steamers, and from data derived from tests of pieces of the material from which the shafts were made he compares the maximum stresses due to vibration with the mean stresses due to the ordinarily assumed working loads. Without going into details it is sufficient to state that the maximum stresses ranged from two to three times those due to a uniform turning moment, showing the insufficiency of the ordinary methods of proportioning shafts for such service. It is evident that any increase in the number of steam cylinders must have a material effect in distributing the impulses, and the harmonic period of the length of shaft under consideration must also be taken into account. All these elements point to the advisability of employing materially increased diameters for propeller shafts and with the use of hollow shafts a greatly increased degree of stiffness can be secured with but little increase in weight.

The above considerations point strongly to the advantages of the steam turbine as a marine engine, and if greater freedom from shaft breakages can be shown to follow the employment of the turbine, owing to its uniform turning moment and absence of vibratory stresses on the shaft, its adoption as a measure of safety can reasonably be urged. At the same time it is important that propeller shafts should be made with a large margin of stiffness, in order to enable the shocks and vibrations due to the action of the waves and to racing to be met with safety.

Such experimental researches as those made by Herr Frahm merit recognition and encouragement, especially in that they act to disturb the too common practice of assuming as a basis for computation data which do not necessarily include all the conditions which actually exist.—Engineering Magazine.

NEWS OF THE GREAT LAKES

DETROIT RIVER BRIDGE MATTER.

Officials of the Lake Carriers' Association are satisfied that they will again be called upon shortly to oppose the construction of a bridge in the Detroit river near Detroit. It is understood that Major W. H. Bixby, United States engineer at Detroit, has been securing data regarding the height of vessels' spars and is otherwise informing himself on the bridge subject. He wrote Capt. Geo. P. McKay, treasurer of the Lake Carriers' Association, a few days ago, asking for any information the association might have as to height of vessels' spars. Of course Capt. McKay explained that the vessel interests did not object to a bridge at Detroit, but they did object to piers in the navigable part of the river. Capt. McKay said:

"The Lake Carriers' Association has interested itself very earnestly in the matter of the bridging of the Detroit river. Several times the matter has been up and the vital question has never been so much of the height or headroom of the bridge as of having artificial obstructions in the way of bridge piers in the channel. We have gone through the matter most thoroughly on several occasions, the last time, perhaps, in 1896, when the railroad companies then asking for a bridge were willing to give a span of 1,100 or 1,200 ft. with headroom of 135 or 140 ft. I have not the exact figures but can get them. We at that time very strenuously opposed, and were credited with the defeat of the project, the sole objection being to the presence of piers in the river. My recollection is that the Lake Carriers' Association were willing to concede 5 ft. off of the headroom proposed by the railroad company, so that the quarrel was not on that subject, but we were absolutely, and I believe unalterably, opposed to having piers placed anywhere in that channel. Your communication will be taken up by the secretary and go through the proper channels, but as chairman of the aids of navigation committee, it is perhaps permissable for me to speak on the subject, and I believe that you will find the lake interests and the Lake Carriers' Association more than opposed to piers in the river, and I trust that you will enter upon the subject with this in view. The hearings and arguments and agitation of the subject in 1896 demonstrated the entire feasibility of a bridge without piers, and the vessel interests demanded that instead of giving to one road and then another permission to put their own bridges across with piers in the river, which would multiply according to the necessity of the railroads, they should be compelled to unite and put up a union bridge without any piers. At that time there were several roads, as it was represented, each willing to put up its own bridge with 1,100 or 1,200 ft. spans, the combined cost of which would exceed the cost of one union bridge with no piers at all. Our counsel, Mr. Harvey D. Goulder, represented the vessel interests in the contest on this subject in 1889-90 and again in 1895-6, in conjunction with Mr. C. H. Keep, the former secretary of the association, and I am sure that those gentlemen can without a great deal of trouble give you all the data on the subject. Mr. Wm. Livingstone, president of the association, was at that time very much interested also, and while I do not suppose that he has the complete data at hand or in mind any more than I have, he has a thorough general knowledge of the subject."

ORDERS FOR TWENTY-SEVEN NEW STEAMERS.

As it is not now probable that the ship yards of the great lakes will add materially to their contracts for vessels to be built for next spring's delivery, a revised list of the orders in hand, with leading particulars of the vessels, is presented herewith. The table shows that the American Ship Building Co. (consolidated lake yards) has orders for twenty-seven steel steam vessels, capable of carrying 109,750 gross tons and to cost $6,200,000. The figures as to cost are not, of course, the actual contract figures, but they are very close to the mark. With one exception, that of a car ferry for the Manistique, Marquette & Northern railway, the vessels are steam freighters. In a season admitting of twenty trips, running up the lakes light after iron ore, these vessels would move a total of 2,191,000 gross tons. Thus year after year, since the building of steel vessels was begun about fifteen years ago, amazing additions of this kind are made to the lake fleet, but the increase in iron ore, grain, coal, lumber and other commodities to be moved provides business for them, and the end, long looked for—demoralization of freights and idle ships—is not yet at hand.

LEADING FEATURES OF TWENTY-SEVEN STEEL FREIGHT STEAMERS UNDER CONTRACT WITH THE AMERICAN SHIP BUILDING COMPANY, FOR DELIVERY IN 1903.

To be built at	Type.	Dimensions in Feet. Over all.	Keel.	Beam.	Depth.	Dimensions of Engines.	Boilers—Dimensions in ft. and in.	Draft.	Steam press. lbs.	Capacity, gross tons.	Value.	For whom building.
Cleveland	Car Ferry	350	338	56	19½	23½, 37, 62x36(2)	Six Scotch, 13-9x12	Natural	175	.....	$400,000	Manistq., Marq. & Nor. Ry.
Lorain	Cargo stmr	434	414	50	28	22, 35, 58x40	Two Scotch, 13-2x11-6	Ellis & Eaves	170	6,200	275,000	H. A. Hawgood, Cleveland.
Lorain	Cargo stmr	434	414	50	28	22, 35, 58x40	Two Scotch, 13-2x11-6	Ellis & Eaves	170	6,200	275,000	W. W. Brown, Cleveland.
Lorain	Cargo stmr	400	380	50	28	22, 35, 58x40	Two Scotch, 13-2x11-6	Ellis & Eaves	170	5,600	260,000	W. W. Brown, Cleveland.
Lorain	Cargo stmr	400	380	50	28	22, 35, 58x40	Two Scotch, 13-2x11-6	Ellis & Eaves	170	5,600	260,000	W. W. Brown, Cleveland.
Lorain	Cargo stmr	400	380	50	28	22, 35, 58x40	Two Scotch, 13-2x11-6	Ellis & Eaves	170	5,600	260,000	W. W. Brown, Cleveland.
Chicago	Cargo stmr	400	380	50	28	22, 35, 58x40	Two Scotch, 13-2x11-6	Ellis & Eaves	170	5,600	260,000	W. W. Brown, Cleveland.
Chicago	Cargo stmr	390	370	48	28	20, 33½, 55x40	Two Scotch, 12-6x11-6	Ellis & Eaves	170	5,250	250,000	W. W. Brown, Cleveland.
W. Superior	Cargo stmr	255	241	41	18	15, 25, 42x30	B. & W. water-tube		170	†2,200	150,000	A. B. Wolvin, Duluth.
W. Superior	Cargo stmr	255	241	41	18	15, 25, 42x30	B. & W. water-tube		170	†2,200	150,000	A. B. Wolvin, Duluth.
Detroit	Cargo stmr	255	241	41	18	15, 25, 42x30	Two Scotch, 13x12	Natural	170	†2,200	150,000	A. B. Wolvin, Duluth.
Chicago	Cargo stmr	255	241	41	18	15, 25, 42x30	Two Scotch, 13x12	Natural	170	†2,200	150,000	A. B. Wolvin, Duluth.
Detroit	Cargo stmr	255	241	41	18	15, 25, 42x30	Two Scotch, 13x12	Natural	170	†2,200	150,000	A. B. Wolvin, Duluth.
Detroit	Cargo stmr	255	241	41	18	15, 25, 42x30	Two Scotch, 13x12	Natural	170	†2,200	150,000	A. B. Wolvin, Duluth.
Buffalo	Cargo stmr	255	241	41	18	15, 25, 42x30	Two Scotch, 13x12	Natural	170	†2,200	150,000	A. B. Wolvin, Duluth.
Buffalo	Cargo stmr	255	241	41	18	15, 25, 42x30	Two Scotch, 13x12	Natural	170	†2,200	150,000	A. B. Wolvin, Duluth.
Chicago	Cargo stmr	255	241	41	18	15, 25, 42x30	B. & W. water-tube.		170	†2,200	150,000	A. B. Wolvin, Duluth.
Chicago	Cargo stmr	255	241	41	18	15, 25, 42x30	B. & W. water-tube.		170	†2,200	150,000	A. B. Wolvin, Duluth.
Detroit	Pass. & frt. stm.	362	340	45	28	22, 31½, 45, 65x42	Four Scotch, 12½x11½	Howden	210	3,500	350,000	Anchor Line, Buffalo.
Detroit	Cargo stmr	372	350	46	30	19, 27, 40, 58x42	Three Scotch, 11½x11½	Howden.	210	5,000	290,000	Anchor Line, Buffalo.
Cleveland	Cargo stmr	374	354	48	28	20, 33½, 55x40	Two Scotch, 12-10x13	Natural	175	5,000	230,000	Mack estate, Cleveland.
Cleveland	Cargo stmr	400	380	50	28	22 35, 58x40	Three Scotch, 12x12	Natural	180	5,600	250,000	H. Steinbrenner, Cleveland.
W. Superior	Cargo stmr	400	380	50	28	17, 31, 55x40	B & W. water-tube.		250	5,600	280,000	A. B. Wolvin, Duluth.
W. Superior	Cargo stmr	400	380	50	28	17, 31, 55x40	B & W. water-tube		250	5,600	280,000	A. B. Wolvin, Duluth.
Bay City	Cargo stmr	376	356	50	28	20, 33½, 55x40	Two Scotch, 12-6x11-6	Ellis & Eaves	170	5,000	230,000	C. W. Elphicke, Chicago.
Bay City	Cargo stmr	436	416	50	28	20, 33½, 55x40	Two Scotch, 13-2x11-6	Natural.	170	6,200	275,000	G. A. Tomlinson, Duluth.
Bay City	Cargo stmr	436	416	50	28	20, 33½, 55x40	Two Scotch. 13-2x11-6	Natural	170	6,200	275,000	G. A. Tomlinson, Duluth.
								Total		109,750	$6,200,000	

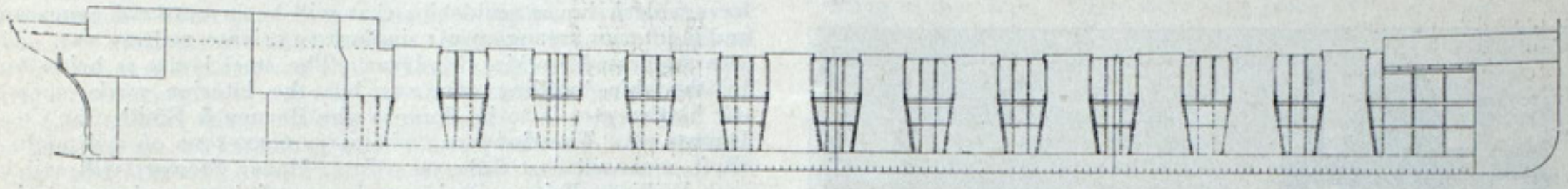
† On 14 ft. draught; all other capacities based on 18 ft. draught.

The list of vessels for next year does not, of course, represent all the business which the ship building combination has in hand. Three or four vessels ordered last winter are not yet in commission but will be before the close of the present season. They are not included in the table. It is still expected that the Detroit works will receive an order from the Detroit & Cleveland Navigation Co. for two side-wheel passenger steamers, the largest ever built on the lakes and to cost together about $1,600,000. These steamers are not in the list. Officials of the Detroit works say that the contract for their construction would have been closed last week but for the death of Senator McMillan.

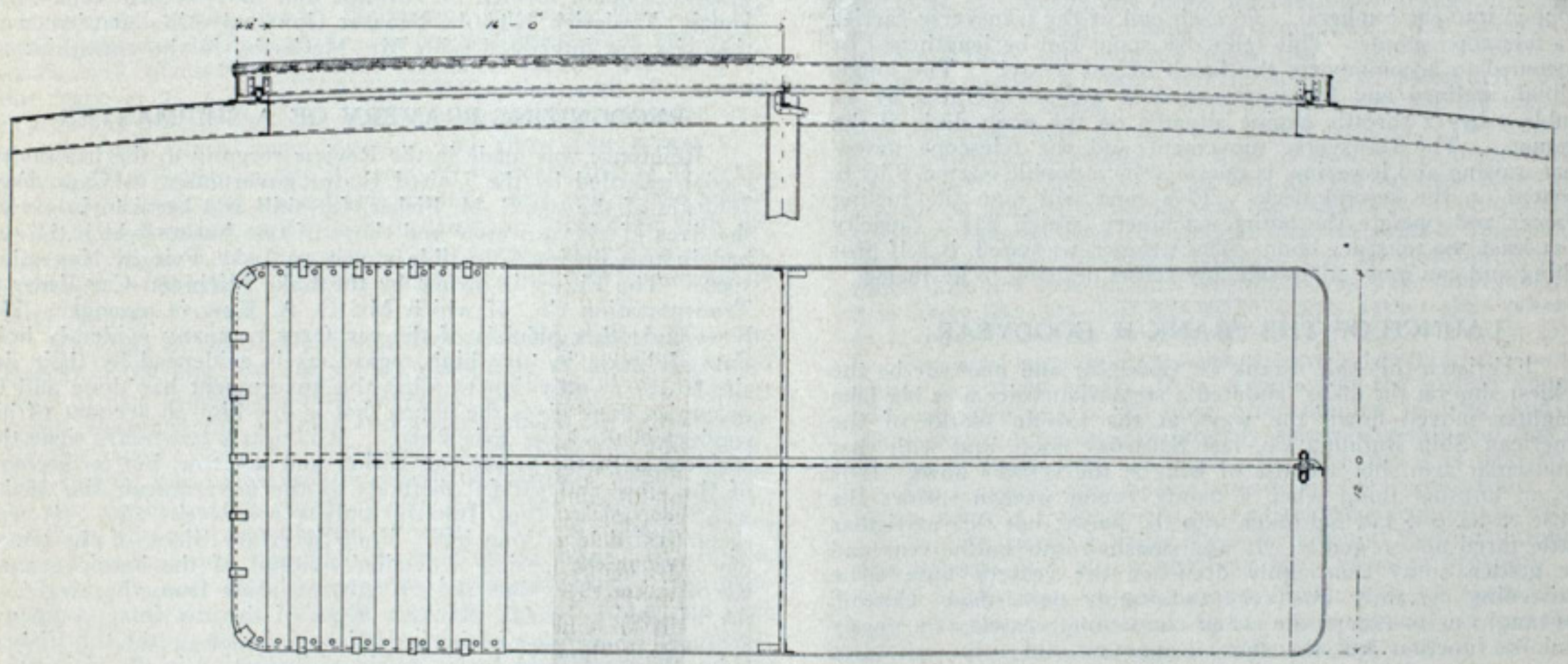
A new feature of construction in some of the large freighters this year is a marked increase in the number of hatches, with a view to facilitating the unloading of iron ore by automatic machines of the clam-shell variety. Not all of the ship owners are agreed that an increase in the number of hatches will be required. Still the two steamers of the Tomlinson fleet (Duluth Steamship Co. and Superior Steam Co.) will each have twenty-four hatches, and two others, to be built for the Provident Steamship Co., A. B. Wolvin, manager, will each have twenty-one hatches. This question of additional hatches, on account of the automatic unloading machines, has been dealt with in special articles in the Review.

PROPOSED TYPE OF ORE CARRIER.

In the last issue of the Review the tendency of a few of the vessel owners to depart from the ordinary method of hull construction of ore carriers in order to facilitate the work of the new automatic unloading machines was noted. Mr. Wolvin's latest steamer, the James H. Hoyt, is constructed with nineteen hatches as against ten in the ordinary steamer of her dimensions. Two more, which are building for the Provident fleet, controlled by Mr. Wolvin, are to have the same number of hatches. Mr. G. A. Tomlinson, who is building two vessels, is also following the lead of Mr. Wolvin in this regard, so that next season there will be at least five vessels with double the number of hatches of the ordinary vessel. Of course so radical a departure, amounting to almost, one might say, an open deck, brings up the serious question of the stability of the ship. How are the sides to be held and the upper parts, which bear the brunt of the strain, to be braced? Can sufficient material be worked into the interior to give the vessel the same rigidity as though its hatches were of the customary 24 ft. centers with large deck space between them? Capt. Herriman if the Great Lakes Register, has designed a compromise vessel which is illustrated in the drawings accompanying this article. Instead of doubling the hatches as in the Hoyt, which leaves only 4 ft. of deck from hatch to hatch, he has designed a vessel with the ordinary number of hatches but with more fore-an-aft space to the hatch. His hatch, as will be noted, is 12 ft. fore-and-aft instead of, as in the ordinary type, 8 ft. fore-and-aft. This leaves 12 ft. of deck from hatch to hatch, and the accompanying drawing shows the arrangement of steel strong-backs which he has designed to compensate in strength for the additional dimensions of the hatch. The design is based upon a vessel of 380 ft. in length, 50 ft. in breadth and 28 ft. in depth. These are practically the dimensions of the Hoyt. Capt. Harriman's contention is that the lengthening of the fore-and-aft dimensions of the hatch will perform the same office that would be performed by additional hatches—that is, facilitate the thoroughness with which the automatic unloaders may do their work and at the same time permit of sufficient strengthening material being worked into the vessel to satisfy the classification societies and through them the insurance companies.



Proposed System of Construction with Hatches 12 ft. long Fore and Aft.



Arrangement of Steel Strong-Backs on Hatches 34 ft. Wide and 12 ft. Fore and Aft.

ACTIVITIES OF THE CLEVELAND-CLIFFS CO.

President W. G. Mather of the Cleveland-Cliffs Iron Co., in a recent interview in Duluth thus outlined the plans and purposes of his company in the upper peninsula of Michigan:

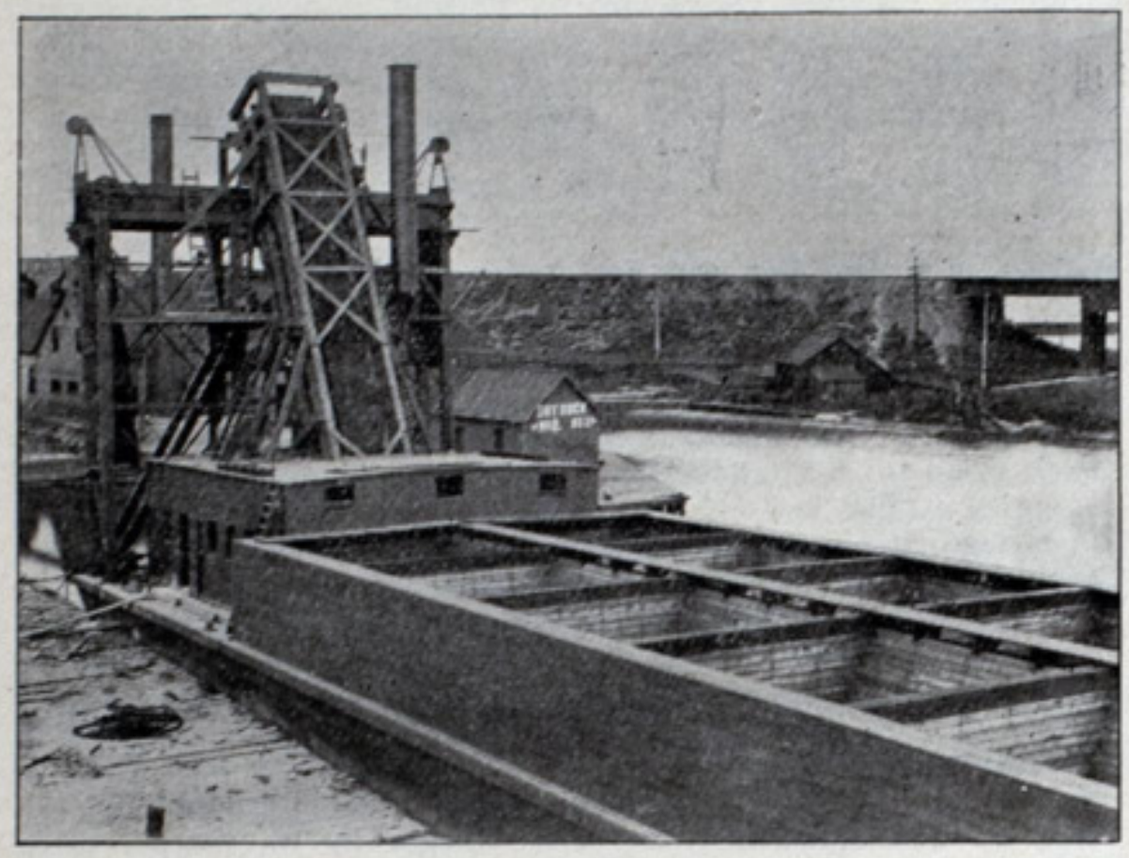
"The Cleveland-Cliffs Iron Co. is operating all its properties in the upper peninsula to their full capacity and the year will be a very busy and prosperous one from our standpoint. We have been working all along to bring about a condition in the upper peninsula whereby the settlers going in there could find a market for the products. The great trouble in the past, since the bulk of the pine has disappeared, has been that the people who would settle up the country could find no market for their hardwood products. We have changed all this. The Cleveland-Cliffs Co. now owns and controls 300,000 or 400,000 acres of hardwood timber land, all in Northern Michigan, and the company is constantly adding to its holdings. We have a charcoal kiln at Gladstone and another at Marquette, both in operation, and by the first of the year will have a second kiln running in Marquette. We have aimed for some years past to manufacture our own charcoal, but have, on occasions, bought some from the outside. At Munising we have started up a new paper mill, which the hemlock on our lands supplies, and a tannery there uses the bark. We are encouraging all kinds of hardwood manufactories to locate along our railway lines and have sold parcels of hardwood timber lands to these people. We have not encouraged the location of sawmills for the reason that they clear off the land too fast. It may be said that our plans have so far materialized that there is practically no waste of the hardwood timber on the lands we control in Michigan. There is, of course, some soft woods mixed in with the hardwood, as hemlock and cedar. The hemlock is manufactured into paper, and the bark goes to the tanneries. The cedar is manufactured into shingles. The best of the hardwood is used by the hardwood manufacturing establishments, and the Cleveland-Cliffs Co. buys back what is left for pulp and charcoal.

"Then, too, another interesting feature about the proposition is that all the by-products of the hardwood are saved. We save the wood alcohol and acetate of lime from which acetic acid is manufactured. A large part of the acetate of lime is exported to Germany and Russia, where it is manufactured into what is termed 'mineral vinegar.' This is a marketable product and can only be distinguished from cider vinegar by its sharper taste. Of course the German and Russian governments keep a watchful eye on the manufacture of the mineral vinegar. In this country there is an ample supply of cider vinegar, and very little acetate of lime is used for that purpose. The Cleveland-Cliffs people have purchased Grand island, in Lake Superior, off Munising, which will eventually be made into a splendid game reserve and pleasure resort. The island is large and heavily wooded, but we have so much other hardwood timber that the timber on the island will not be touched. It is the purpose to make the island one of the finest preserves in the country. All the hardwood for our charcoal kilns at Gladstone is hauled over the Soo road, while the kilns at Marquette are supplied from our own road between Marquette and Munising."

About $100,000 will be spent during the next few months by the Buffalo, Rochester & Pittsburg railway in enlarging its ore docks on Blackwell canal, Buffalo, and when the work is completed the dock capacity will be doubled. The dock now has a capacity of 200 tons an hour. Among the improvements contemplated will be the installation of an improved Hulett unloading machine. The change will be completed by the opening of navigation next season.

NEW TYPE OF FUELING STEAMER.

The C. O. Bartlett & Snow Co. of Cleveland have just designed and built for M. A. Hanna & Co. of Cleveland, a self-propelling, twin-screw fueling steamer for use in Erie harbor. The vessel is 165 ft. long and about 35 ft. wide, with a carrying capacity of 700 tons. The coal is carried in receiving hoppers or pockets, which run nearly the whole length of the vessel. A longitudinal carrier runs the entire length of the bottom of the vessel, which when it is desired to fuel a steamer, receives the coal by means of gates at the bottom of each hopper or compartment. Each hopper is provided with three gates or openings, which are quickly opened and closed. The coal is carried along by the longitudinal carrier and emptied into another inclined carrier, which is located near the stern of the boat. This inclined carrier takes the coal up and discharges it into a transverse carrier, located on top and mounted on an iron frame, which can be made high enough to suit any vessel and so arranged and constructed as to be moved out in either direction over the vessel that is being fueled—or far enough to admit of the coal being dropped into the bunkers. To each end of the transverse carrier is a telescope spout. This telescope spout can be lengthened or shortened to accommodate the hatch of any vessel. The longitudinal, inclined and transverse carriers are all operated by a double 9 by 12 throttle engine situated on the main deck of the steamer. The transverse movement and the telescope movement, raising and lowering, is operated by a double engine, 8 by 9, situated on the second deck. Five men will man the fueling steamer and operate the entire machinery, which has a capacity of at least 300 tons per hour. The steamer, as stated, is self propelling and can move alongside any vessel desiring to be fueled.



Fueling Steamer for M. A. Hanna & Co. Built by the C. O. Bartlett & Snow Co., Cleveland.

LAUNCH OF THE FRANK H. GOODYEAR.

"I christen this ship Frank H. Goodyear and may she be the luckiest ship on the lakes" shouted a stentorian voice as a big lake freighter moved down the ways at the Lorain works of the American Ship Building Co. last Saturday noon, and with that a muscular arm shot a bottle of wine at the vessel's bows. It is not an unusual thing when a dainty young woman throws the bottle to have it fall unbroken into the berth; but this particular bottle fared not so gently. It was smashed into smithereens and the golden spray thoroughly drenched the vessel's nose. The christening certainly was very thoroughly performed. Custom has taught us to regard the act of christening vessels as a purely feminine function, and, therefore, it appeared odd to the beholders to see a stalwart man perform the ceremony. Usually it is some young symphony in pink who lightly taps the vessel's stem with the cypress slender minister of wine, but had this vessel the power of articulation it would probably have rebelled as the blow which it got on its snout as it sped down the ways. It was owing to the unavoidable absence of the other half of man that Mr. H. H. Gardiner, great of physique and of a merry humor, performed the necessary office of christening. The ship building company invariably presents to the "young thing" who does the christening, a beautiful bunch of American Beauty roses, and even upon this occasion this delicate attention was not omitted. The roses were held during the ceremony by Mr. T. T. Morford, steamboat manager at Buffalo, in much the same gingerly and uncertain fashion that a man holds a strange baby. They were presented with a sweeping bow by General Manager James C. Wallace to Mr. Gardiner, who simulated the confusion of the " young thing" to perfection. Messrs. Gardiner and Morford were accompanied from Buffalo by Walter Jerome Dunham and George Urban, Jr. They came as friends of Mr. Goodyear for whom the ship is named and who is largely interested in her. Mr. Goodyear is at the head of the Buffalo & Susquehanna railway and deals on a very large scale in hemlock bark and hemlock timber. Mr. Gardiner is general freight agent and passenger agent of the railway. Capt. John Mitchell, for whom the Goodyear is built, entertained the Buffalo gentlemen, officials of the ship building company and a few friends ot the Union club after the launch. A similar steamer, also for Capt. Mitchell, will be completed at the Lorain works before the close of the present season of navigation. This will give Capt. Mitchell twelve of the largest and finest freighters on the lakes. The new steamer is 436 ft. over all, 416 ft. keel, 50 ft. beam and 28 ft. depth of hold. She has triple-expansion engines with cylinders 22, 35 and 58 in. diameter and a common stroke of 40 in. Steam will be provided by two Scotch boilers, 13 ft. 2 in. wide and 12 ft. long, allowed 175 lbs. steam pressure. She departs somewhat from the ordinary construction of hold, owing to conditions which have latterly arisen in the use of automatic unloading machines. Mr. Robert Logan is responsible for these changes in hull construction. The vessel will have a deck house amidships that will be in outward appearance and in interior arrangements similar to a private railway car. This was suggested by Mr. Goodyear. The steel house is being built by the ship building company but the interior work, such as car berths, etc., is to be done by the Barney & Smith Car Co. of Dayton, O. The Goodyear will carry 6,200 tons on a draught of 18 ft. and will cost $280,000. Capt. Harry Stewart will sail her and William Fritz will have charge of her machinery. Capt. Stewart is mate of the steamer James Gayley of the Mitchell fleet. Last season he was master of the steamer William F. Sauber.

TURRET STEAMERS FOR THE LAKES.

It is quite evident that Hon. Mr. Tarte and other members of the Canadian government are fully alive to the necessity of increasing Canadian transportation facilities in their own channels, and it is not surprising therefore, that new lines of vessels are planned at Toronto and several other places in the lake district. It would not be surprising to find quite a fleet of vessels of the turret type, now owned by Peterson, Taite & Co. of Newcastle, England, engaged in the Canadian lake trade next season. The Newcastle firm has quite a few vessels of the turret kind (several times described in these columns) that would be well suited to lake service. Reports from Toronto indicate that Mr. F. R. McCarthy of Montreal, steamship and freight broker, has arrangements well in hand that will provide business for several of these vessels. He has had business connections with Peterson, Taite & Co. for a long time past and is well acquainted with the lake trade. It is understood that a company to operate the vessels is being formed in Toronto, and that Messrs. Wm. Mackenzie, Frederick Nichols, Senator Cox and other gentlemen of that city are interested with Mr. McCarthy in the enterprise.

RECOGNIZING BRAVERY OF A SHIPMASTER.

Reference was made in the Review recently to the life-saving medal awarded by the United States government to Capt. Fred Johnson of the tug S. M. Fisher, for skill and heroism in saving the lives of his own crew and those of two barges which the tug had in tow during a terrible storm on Lake Erie in November 1900. The Fisher is owned by the Lake Michigan Car Ferry & Transportation Co., of which Mr. O. A. Koss is manager. Mr. Koss and other officials of the car ferry company evidently hold Capt. Johnson in very high regard, as is evidenced by their desire to direct attention to what the government has done and to recognize themselves the honor that is due him on account of his conduct in the Lake Erie storm. It is nearly two years since the accident occurred to the tug Fisher and her tow, but on account of the slow and careful methods of the government, the medal was received by Capt. Johnson only a few weeks ago. It was accompanied by a long letter from Secretary Shaw of the treasury department giving a detailed account of the heroic rescue. Recognizing the value of such a letter, aside from the award of the life-saving medal, Manager Koss of the car ferry company, arranged a meeting of friends of Capt. Johnson on the tug Fisher a few days ago, and during a trip of inspection in the vicinity of Calumet harbor (South Chicago) a very pleasing ceremony was carried out. The letter was read in full by Congressman James R. Mann and the congratulations of the party extended to Capt. Johnson over a sumptuous lunch that had been prepared for the occasion.

Notwithstanding the difficulty that ship yards are generally experiencing in getting material from the steel works, it is expected that the fire boat which the Ship Owners Dry Dock Co. of Chicago is to build for the city of Milwaukee, under the supervision of W. J. Wood, naval architect of Chicago, will be well under way in a couple of weeks. Plates for the hull will not be forthcoming, however, until October or November. The boat is to be launched into the big dry dock of the Ship Owners company. Propelling machinery and boilers for this vessel are finished, the former at the works of the Chicago Ship Building Co. and the latter at the works of John Mohr & Sons. The pumps, which are building at the works of the American Fire Engine Co., Seneca Falls, N. Y., are also practically completed.

LAKE SHIP YARD MATTERS.

Craig's Ship Yard at Toledo has secured a contract to build a car ferry for the Crosby Transportation Co., which for several months has been contemplating establishing a car ferry service between Milwaukee and Grand Haven. The new company will be known as the Grand Trunk Ferry Co. and it is understood that traffic arrangements have been made between officials of the Grand Trunk system and the Crosby Transportation Co. The new ferry boat will be 300 ft. long, 54 ft. beam and will have a capacity of thirty-six cars and 1,000 passengers. The cost of the ferry will be in the neighborhood of $300,000.

The Craig Ship Building Co., Toledo, O., launched the tank steamer Toledo a few days ago. She is 263 ft. long, 42 ft. beam and 26½ ft. molded depth. She will have two boilers, 14 ft. in diameter and 12 ft. in length and each will have three corrugated furnaces. The steamer will have triple-expansion engines of 21, 37 and 58 in. diameter of cylinders with stroke of 40 in. Her indicated horse power of 1,500 is designed to drive her at a speed of 10 knots per hour, loaded. She will not only be an oil carrier but an oil burner as well. The vessel is divided into two parts by one long bulkhead and her compartments are subdivided into four smaller ones, making eight tanks. She was built for the Sun Oil Co. of Pittsburg, and will run between Port Arthur, Texas, and Marcus Hook, Pa. She is valued at $225,000 and will be ready to leave the Toledo yards in about thirty days.

Algoma Navigation Co. is the name of a Canadian corporation recently organized at Toronto to establish a special steamship service between Owen Sound, Ont., and the Sault. Messrs. A. Miscampbell and T. M. Kirkwood of Toronto are now arranging with Mr. Frank E. Kirby, naval architect of Detroit, to prepare designs of the steamer which is to be built by the Bertram Engine Works of Toronto. The cost is to be about $110,000. The new steamer will be constructed entirely of steel and will be about 190 ft. in length by 34 ft. beam. She is to have a capacity of 700 tons, with about fifty staterooms and first-class sleeping accommodations for 110 passengers. She will be heated by steam, lighted by electricity, and modern in every respect. Her speed will be 16 miles an hour, this being necessary in order to make two trips a week between Owen Sound and the Sault. The boat is to be ready for business by the opening of navigation next spring.

Officials of the Great Lakes Towing Co. are very much pleased with the steel wrecking lighter just completed for them by the Jenks Ship Building Co. of Port Huron, and which has been named Thomas F. Newman. This vessel, stationed in the vicinity of Detroit and fitted with everything modern in the way of wrecking apparatus, will perform very effective work on vessels stranded in the rivers. Traversing the entire length of the main deck on a 16-ft. track is a 60-ton McMyler crane and hoist, which will manipulate a 5-ton clamshell scoop. The arm of the crane is 75 ft. long and may be handled with the utmost ease to any part of the boat and when alongside a grounded vessel this will extend over the side and allow free access to a cargo. The lighter is 175 ft. long, 36 ft. beam and 15 ft. deep, is double braced and exceedingly strong. She cost in the neighborhood of $100,000, and will be operated in connection with the wrecker Saginaw, the property of the Great Lakes Towing Co., stationed at Windsor. The new lighter will be in command of Capt. George Dayton.

Through an inadvertence the Review forego to mention the launch of the large car ferry Pere Marquette 18 at the Cleveland yard of the American Ship Building Co., lately. Mr. Robert Logan designed the steamer and superintended the construction for the owners. She was christened by his daughter, Miss Beatrice Logan, who observed the beautiful Japanese custom of releasing doves as the vessel moved down the ways instead of breaking the customary bottle of wine. Pere Marquette 18 will be the most powerful craft of her kind on the lakes. She is fast, of greater power and has superior accommodations. Her principal dimensions are: Length over all, 350 ft.; length on keel, 338 ft.; beam extreme, 57 ft. 9 in.; beam, molded, 56 ft.; depth, molded, 19 ft. 6 in.; depth from keel to top of sheer strake, 20 ft. 4 in.; height between decks, 16 ft. 9 in. The two engines will be triple compound, direct-acting, vertical jet condensing and will be equipped with air and cooler pumps. All the working parts of the main engines, including shafts and propellers, will be made extra heavy for service in working through ice. The cylinders of the engines are 22½, 36 and 59 in., with 36 in. stroke. The boilers will number six, each of which will have a working pressure of 175 lbs. to the square inch. They will be 13 ft. in diameter and 12 ft. long, and each will have three Morison corrugated furnaces, 3ft. 6in. in diameter. The entire hull will be sheathed with steel, shell plates 1 in. thick. Running 75 ft. from the bow, these plates will be doubled from the keel to a line 3 ft. above the waterline as a protection against ice. The ferry will have four tracks on the main deck, which will carry thirty cars. Fifty staterooms and additional berths will provide sleeping accommodations for 250. The ferry will be placed on the Manitowoc-Ludington run and is expected to make 15 miles an hour in regular service.

LABOR DIFFICULTIES AT BUFFALO.

Buffalo, Aug. 20.—This port has gone out of the ship building business, at least so far as the Buffalo yards of the American Ship Building Co. are concerned, and the situation is anything but a pleasing one to anybody but those who are making the trouble. It all came about on account of the effort of the men to hold up the tug strike. One day last week the tug Hebard went into dock for repairs. After the job was begun it was found that she belonged to the Great Lakes Towing Co. and the men refused to go on with the work. So the management of the ship yard was obliged to stop business and it was thereupon decided to shut down entirely. All the docks are idle and since that time half a dozen boats have been turned away. There is, of course, feeling in the matter but the actual reason for taking the step is that it was feared that the action of the men, in stopping work on vessels after it had been started, would give this port a bad name and it was thought better to do nothing than to do anything in that way. There were only from 300 to 400 men at work at the docks but at one time last winter the list ran up to 1,300 and it was likely to ge still higher the coming winter.

As it is now there is a good prospect of nothing whatever being done next winter. Plans are being made to build elsewhere the two steel steamers that were set down for construction here. Material has been stopped so that it would take quite a long time to get in line again for building if the differences should be patched up, which is a prospect decidedly remote at present. Great disappointment is expressed on the part of the builders, especially on account of the injury it will do this port. It was always more of a minor port in the matter of ship building and repair work than its general importance warranted. but since the combining of the ship yards it had been easy to increase the business in that line here and it had been done very steadily, though it can hardly be said to have been satisfactorily, for there has always been considerable friction, especially since the tug strike took place. While the rebuild of the Northern line passenger steamers was under way there was frequent difficulty, most of which was borne by the builders to get the work done somehow. As it was done by the day, it was not as losing to them as it would have been under a contract.

The question seems to be what to do next. It appears that so far as the towing company is concerned there is nothing new thought of. It has been able to maintain its principles in so many ports that it is in no sort of financial distress. In fact in ports where it is now able to do its entire work with less than half the number of tugs that the union rules had formerly made necessary, it is found that money making is easy. But there is hardship in some of the ports for all that. Vessel owners do not like to go to Chicago any more, for there are no tugs in commission there big enough to handle a large vessel. The many bridge accidents there this summer show that. And it is soon to be worse of course, for there will be storms to encounter. So far Buffalo has got along very well, but there are not the tugs running here that there should be in windy weather. The other day in still weather a steamer of what is now called moderate size was close to six hours winding and getting through Main street slip, all on account of insufficient tug assistance. The grain business has been so light this summer that the need of tugs has not been great. Our increased business has all been in iron ore, which does not demand dock shifting, so we have done nicely and it is likely that the fleet has made money rather than otherwise on account of the necessity to do without tugs to a great extent.

But what is to be done when the grain begins to move again, which it will do soon? It is certain that the towing company will not yield any points now, after fighting so long, and it is stated that the tug men are already demanding this and that concession of those who are employing them till it is next to impossible to make any money outside of the combination, all of which, when it comes to the ears of the tug combination officials, will be very likely to cause them to hold out more determinedly than before. It is surely anything but a pleasant prospect.

It has been a very quiet season in this port, but there is prospect of considerable improvement soon, though it cannot be said that we are in the best possible position to profit by it.

The steamer Hancock of the United States engineers' department is now at work making preliminary surveys and borings in anticipation of the drafting of specifications for the new canal to the westward of the present St. Clair flats canal at the mouth of the St. Clair river. The sum of $330,000 was appropriated for the proposed work in the last rivers and harbors bill. The new canal, when constructed, will be directly to the north of the present cut and will provide a separate channel for down-bound vessels. The present canal was completed and opened to navigation July 25, 1871, in accordance with the provisions of the rivers and harbors bill of March 2, 1867, at a cost of $460,000. When the canal was built 3,000,000 tons of traffic went through it during the season; now it is estimated that more than 40,000,000 tons are going through. The commerce has grown so important that it is unwise to longer risk the blockading of this canal by the sinking of a vessel in it. Maj. W. H. Bixby will have charge of the work of constructing this canal.

AROUND THE GREAT LAKES.

The Prescott Elevator Co. of Ogdensburg, N. Y., has sold its half-million bushel elevator to the Wolvin syndicate for $85,000.

Not more than 18 ft. 4 in. draught is the latest warning from the Lake Carriers' water signal committee to vessels passing over the Lime-Kilns and other shallow places in the Detroit river.

Grain stocks at the head of Lake Superior are now reduced to the lowest ebb known in ten years. On Tuesday the wheat stocks aggregated 600,000 bu. and the coarse grain stocks only 150,000 bu.

The C. H. Starke Dredge & Dock Co. of Milwaukee, will do 800,000 yards of dredging near Green Bay on a bid of $96,000. The Duluth Dredge & Dock Co. bid $112,000 on 200,000 yards of all kinds of dredging at Menominee and will be awarded the contract.

Capt. Archibald Taylor, well-known lake master and ship owner, died in Toronto Monday at the age of ninety years. His activity was regarded as phenomenal. In 1876 he was appointed deputy harbor master and retained that office until 1896, when he retired.

Maj. Dan C. Kingman has recommended that all the bids for improving the harbor at Sandusky be rejected. They were too high. He has recommended that the bid of L. P. & J. A. Smith of $37,000 for dredging the Cuyahoga river below the Lake Shore bridge in Cleveland be accepted.

It is announced from Duluth that the principal shoal spots in the Duluth-Superior harbor have been removed by dredging, so that 20 ft. is the minimum depth of water from the harbor entrances in all the channels and basins in Superior bay, the gate basins and the channels in St. Louis bay, as far as the Northern Pacific railroad bridge across St. Louis bay.

Supt. Ripley of the ship canal at Sault Ste. Marie has designed a model of a dam to stop the flow of water in the canal should a break occur to either of the locks requiring it. Col. Ernst of Chicago, division engineer of the northwest, and Maj. Bixby of Detroit, who are now on a tour of inspection, were shown the model and were greatly interested in it.

H. F. Corsaut who for the past six years has been with L. C. Waldo and the Northwestern Transportation Co. of Detroit, is going to sever his connection with the firm on Sept. 1 and embrak in business with the American Underwriters' Co., dealing in stocks, bonds and securities. He will be succeeded by George Barriman, who has been policy writer and bookkeeper for the insurance department of A. A. & B. W. Parker.

Mr. E. M. Richardson of the Sherwin-Williams Co., Cleveland, who is well known in shipping and ship building circles throughout the country as well as on the lakes, has just returned from an extended European trip. The paint company which Mr. Richardson represents has branch houses on the other side of the Atlantic, and conducts a very large business on the Clyde and in other leading ship building districts of the world.

Regarding the demands of the Lake Seamen's union and the Marine Cooks' association for an advance in wages beginning Sept. 1 the vessel owners have appointed a committee with power to act, to meet with the heads of the unions, including President Keefe of the International Longshoremen, Transport and Marine Workers' union, and to endeavor to arrive at a settlement of the question. The conference will be held in Cleveland, and it may be the end of the week before a settlement is reached. The cooks want an advance of $5 per month and the wheelsmen and watchmen (Lake Seamen's union) $7.50 per month.

Books of sailing directions of great lakes, issued by the United States hydrographic office and now complete as to all the lakes, are sold at such low prices that they are very much in demand, especially by the young men aboard the vessels. These books not only contain sailing directions, and complete information as to lights, fog signals, etc., but are also valuable on account of parts dealing with the compass, the barometer and other subjects of interest to the mariner. There are four books and three supplements (the latter bringing them up to date) and the whole lot, covering the entire chain of lakes and connecting rivers, sell for $1.90. They could not be published as a private enterprise for ten times that amount, but of course the government simply asks for cost of printing. Any or all of these books may be had from the Marine Review Pub. Co.

A sloop-rigged auxiliary gasoline launch named Augusta, has been running during the season from Ludington, Mich., to Wisconsin ports in the fruit trade. The odd looking craft is 25 ft. long, has a commodious over-all cabin and is propelled by both wind and gasoline. The machinery is not very reliable, however, and on a recent occasion the Augusta was picked up in mid-lake by car ferry Pere Marquette 17 and towed to Manitowoc where she discharged her cargo of fruit, repaired her engine and returned for another load of peaches. One man, a clever Bohemian, is captain, owner, engineer, mate and crew combined, and he does not hesitate to go anywhere in almost any kind of weather with his freak boat. When the gasoline engine is running its boisterous exhaust can be plainly heard a distance of 10 miles. The lone sailor has ingeniously arranged a steering apparatus which is operated from inside the cabin where the engine is located. A small dynamo furnishes electric light at night, and a power pump is used to force water through pipes and faucets to all parts of the boat. The skipper avoids all acquaintance with the curious public, never inquires about weather conditions, and goes and comes when he pleases. The craft has been dubbed the "Watermelon" boat from the fact that she has carried several cargoes of that fruit to the resorters at Epworth Heights.

ENTHUSIASTIC OVER OIL FUEL.

Mr. W. H. Pierson of San Francisco is in Cleveland, inspecting a couple of boilers under construction at the works of the American Ship Building Co., for a ferry boat that is building at the Risdon Iron Works. Mr. Pierson is engineer of the railway company that is to own the ferry. The order for the boilers was given to the Cleveland works mainly on account of the scarcity of material on the Pacific coast. The boilers are of peculiar construction, suited to the use of oil as fuel. The Review hopes to illustrate and describe them later on. Mr. Pierson speaks in a most enthusiastic way about the use of oil for fuel on the Pacific. The successful use of the oil on steamboats undertaking voyages of several thousand miles, as well as in the factories of San Francisco and vicinity, has had such an effect upon trade in the high-priced coal of the Pacific coast, that large vessels formerly engaged in carrying coal are laid up, and it is now quite certain that the oil has replaced coal in a very large degree for steam purposes. Especially is this true of the steamship lines trading to San Francisco. New vessels are designed to use oil and great numbers of vessels already in service have been fitted with the necessary storage tanks and apparatus required under their boilers for the oil. Instead of carrying twenty-five or thirty firemen and coal passers on long voyages, the furnaces of big ships are now attended to by a couple of men looking after valves that regulate the flow of oil. There is no loss on account of the delay in cleaning fires, the labor attending removal of ashes, etc., and it is claimed that the new fuel is so much lower in cost on these and other accounts, that it is being generally adopted with every expectation of permanency.

INNOVATION OF MODERN BRIDGES.

The innovation of the modern bridge across navigable waters is a great comfort to the sailor, but he is sometimes very much puzzled to know how it is all done and he looks for pretty nearly anything in that line now. An old lake captain tells this story: He had been sailing to Chicago steadily in the days of the old swing bridge and then went to Lake Superior for quite a good while. He had kept acquainted with the bridge revolution all along but his mate had not, so when the steamer was at length ordered back to Chicago there were a great many new things to wonder at as they went up the river. It was night, and that added more or less to the idea of the wonderful. The mate was from the Green Isle and he was very large eyed when the first bridge they approached opened up like a jack knife and let the steamer through with a lot of spare room on both sides. Next time the bridge they came up to rose in the air like a balloon and let the steamer pass under. The mate was about to jump overboard when he thought of what might happen next time. The captain watched him narrowly, but said nothing for he knew that something rich was to come. At last the mate could hold in his curiosity and astonishment no longer. "I say captain," he cried, "will they take us up and fling us over next time?"

SHIP YARD NOTES.

The Kelley-Spear Co., Bath, Me., launched the new four-masted schooner Samuel P. Bowers last Thursday.

Jefferson McCausland, Rondout, N. Y., is building a tugboat for New York parties. He will also later build a barge.

At Brooks' ship yard, East Boston, Mass., a four-masted wooden schooner is being built for Providence owners. Her dimensions will be: Length over all, 190 ft.; keel, 160 ft.; beam, 36 ft.; depth, 14 ft.

The navy department has just given an order to the shipbuilding firm of E. & I. K. Stetson of Bangor, Me., for four lighters of the following dimensions: Length, 86 ft.; beam, 29 ft.; depth, 9 ft. They will be used to transfer coal at the new naval station at East Lamoine.

The new steam yacht Coranto, building by the Gas Engine & Power Co. and Charles L. Seabury & Co., Consolidated, Morris Heights, N. Y., for A. E. Austin of Providence, R. I., was successfully launched last Saturday. The Coranto is being constructed by designs by Gardner & Cox and is a modern steel steam yacht, carrying two pole masts. She is 155 ft. in length over all, 120 ft. on the water line, 20 ft. beam and 12 ft. 6 in. depth. The owner's quarters consists of four single and two double staterooms with two bathrooms, all handsomely finished in white pine, mahogany trimmed. These quarters are aft on the machinery bulkhead. Space forward of the machinery is entirely devoted to the crew's quarters, including the galley. There are staterooms for the chief officer and bunks for the rest of the crew, and for a total of eighteen men. A teak deck house, 70 ft. long, is devoted to a dining room, music room, and card room. The yacht is lighted throughout with electricity. The propelling power is a Seabury water-tube boiler and a triple-expansion engine. She is designed for a speed of 14 knots.

SAFETY AT SEA.*

BY REAR ADMIRAL GEORGE WALLACE MELVILLE.

Since the advent of the present year two events have occurred which have made it clear that those who go down to sea in ships are still exposed to danger. The disappearance of the British gunboat Condor and the disablement of the Cunard steamship Etruria prove that, despite the skill of commander and crew, accidents are likely to happen to ocean-going vessels which will imperil the safety of ships and passengers. Both these ships had single screws, and an irreparable injury to the propelling engines of either would put her at the mercy of an angry sea. Very few steamships now carry sail. The competition between ocean-going steamers for passengers and cargo is so keen that it would not be commercially profitable for steamships to carry the top-hamper and extra men that would be necessary for the management and handling of sail. The warship has also dispensed with masts and spars because the fighting vessel is now regarded as a simple gun-platform, and any attempt to use sail would interfere with the working of the guns and the securing of a rapid ammunition supply. In the days of sail a ship was rarely disabled to an extent that would prevent her from eventually reaching port. It was seldom that there happened a worse casualty than the ripping out of a mast; and severe as was the damage that might be caused by such an accident, the ship could still possess sufficient area to steer handily.

When steam was first used on ships as motive power it was only intended that the machinery should be used when going in and out of port, when crossing calm belts, or when great despatch was necessary. The possession of both sail and steam involved a cross security which made it rare for a vessel to be lost at sea. In the early days of steam navigation, the machinery was made very heavy. The designer gave a large factor of safety to every working part, so that there was little liability of permanent breakdown. It was said that, with the exception of the cylinders nearly every portion of the early marine engines could have been built by a blacksmith or boiler-maker; but substantial structures were required when blacksmiths and boiler-makers were sometimes assigned to their care and management. It was not long before it was discovered that the use of sail on board a steamer was incompatible with the earning of fair dividends. Gradually, therefore the sail area was lessened and the steam installation increased; but while this development gave more money to the owner of the vessel, it afforded less security to the passengers and the crew.

The passing away of the ships of oak with their clouds of snowy canvas, to make way for vessels of steel with their throbbing engines, gave a wonderful impetus to the shipping industry. Remote islands and hermit nations were brought into closer touch with the manufacturing and maritime countries of the world. As time became an important factor in the delivery of ocean cargoes, there came urgent demand for faster ships. Not only was there a desire for a marked increase in speed, but there was also a call for greater steaming radius upon the part of the vessel. The competition between different corporations for the carrying trade of the world made it compulsory that ships making long voyages should frequently put into port to replenish coal bunkers. It was inevitable, therefore, that marine machinery should be made to work more economically, and that it should be built much lighter. With this progression, there was a corresponding advance in the skill, intelligence and character of the engineer's force. Competent as the complement in the engine and fire-rooms might become, and skilled as the supervision might grow, the fact was ever kept before the mind of the engine-designer that every ton of machinery was dead weight, and that every pound saved in this respect permitted the carrying of another pound of cargo.

The weight of machinery allowed in proportion to the horse power developed has been rapidly decreasing, and this accounts for the great number of accidents that are happening at sea. Although there has been steady improvement in the strength and uniformity of the material that enters into the construction of marine machinery, every advance in this direction only encourages the engine-designer to reduce the factor of safety and thus lighten the weight of the machinery parts. The degree to which machinery weights have been decreased could not be more impressively illustrated than by stating that the horsepower developed in a modern torpedo boat of 150 tons trial displacement exceeds the horsepower that was required for a 3,000-ton Cunarder thirty years ago. The piston speed of engines has been doubled and in some cases nearly trebled; and it need not be surprising if the breaking of a shaft or the cracking of an engine-frame occasionally happens. The point has now been reached when the state should give better protection to ocean-going passengers, and the most effective way of securing this reform is to prohibit any single-screw steamer from being regarded as a subsidy mailboat. It is rather surprising that ocean-going passengers will consent at this late day to travel on board a steamer that is fitted with a single-screw. It is more surprising still that there is afloat a private yacht installed with a single-screw propelling engine.

The building of twin-screw engines was the sequence of reducing sail on ocean-going steamers. As the sailing vessels carried spar sails and spars, it was necessary to devise some expedient for making the steamer as safe as the oldtime clipper. The advantages resulting from having practically two installations of motive power were very great. Increased security was given to passengers and crew. The commander was enabled to handle his vessel in a manner that could not be done previously. Economy in the consumption of coal was obtained. Structural benefits were also secured, for the engine parts could not only be made interchangeable but lighter, and repairs could be effected much more quickly. There were two disadvantages of such installation—increased first cost, and additional expense in management and maintenance; and it is to save less than 15 per cent. in the first cost of machinery and 2 per cent. in the cost of management and maintenance that thousands of single-screw steamers are kept plying on the ocean highway. The cost of installing twin-screw engines need not be much greater than the cost of a single screw of the same power. With twin screws the parts are smaller, and they can be handled, assembled, and fitted more economically. The cost of modern marine engine forgings increases in rapid progression with size, and the saving that would be effected in this direction would be very large. Several years ago the Union Iron Works of San Francisco volunteered to install in a gunboat of the navy, without extra cost, a set of twin-screw engines instead of the single screw that had been arranged for the ship. Other instances could be given where reliable ship building firms, under special conditions, have offered to install twin screws at a slight cost above that demanded for single screws. With the installation of twin-screw engines the insurance of ship and cargo would cost less. Additional earnings would also be secured; for, if ocean traveling were made safer, people would be willing to make a sea trip who could not now be persuaded to embark on an ocean liner. The increase in revenue from carrying additional passengers would soon make up for any increased first cost of installation of motive power, as well as for the higher cost of maintenance. Self-interest should cause steamship owners to build twin-screw vessels, even if the demands of humanity should not prompt such form of maritime construction. When a corporation should act and will not act, then is the time for the state to intervene.

Not only should every sea-going steamer be installed with at least two screws, but the vessel should be required to possess an inner and an outer hull, so that, if either structure should be ruptured, the vessel could still proceed on her way. The appalling loss of life caused by the sinking of the City of Rio de Janeiro could have been prevented if that vessel had been built on the cellular system. She had crossed the Pacific, she had heard the fog horns of the Golden Gate, and while groping in the mist for the entrance to the harbor of San Francisco, she struck a rock and sank within a few minutes. The financial loss alone resulting from the sinking of that ship was sufficient to have fitted double bottoms to every vessel of the line to which she belonged. It is not only the outer hull which is likely to be ruptured, from striking a reef or from collision, but even the inner hull may be seriously rent from various causes. The fact will not be forgotten that, when the collapse of one of the twin screw engines of the City of Paris took place, some of the reciprocating parts of the disabled engine tore a hole in both the outer and inner bottoms. The ship reached port by reason of the fact that her cellular system of construction prevented the other engine compartment from being filled with water. The Oregon—the Constitution of the present generation—would now be a wreck near Shantung promontory on the China coast if it were not for the fact that she had an inner as well as an outer hull. The saving of that historic ship to the service by reason of the fact that she had double bottoms will pay for all the inner hulls that the American navy will require for the next ten years.

Those who have reason for crossing the Atlantic in five days are willing to pay for increased security, and it would be a good investment for future greyhounds to be fitted with three sets of propelling machinery. Thousands of persons in this country do not consider it an extravagance to travel in a special car. Tens of thousands of people use the Pullman day coaches even for short journeys. Such a class of patrons should insist that all passenger steamers whose motive power was over 20,000 H. P should have triple screws installed. Ship owners may object to the additional first cost for the installation of twin screws. But the class of tourists who travel in such boats would cheerfully recognize the fact that increased protection was worth paying for. Such an installation of motive power would also increase the chances of the vessels running upon schedule time. It may be incidentally stated that the triple screw is no novelty in naval construction. It is in use in foreign navies, as well as in our own for Russia, France, Germany and the United States have war vessels fitted in such manner. France has ten battleships and nineteen cruisers of this type. In the case of Germany the decision has been practically reached, after competitive trial of the twin and triple screw systems, to adopt the triple screw design exclusively in all future warships of the home fleet. The distribution of power by triple screws in very large powered ships is simply keeping pace with progressive naval construction

*Condensed from the August number of the North American Review.

TRADE NOTES.

The Jessop Steel Co. of England, is building a large steel plant at Washington, Pa., in which electrical power distribution will be employed. The company has recently purchased a considerable amount of direct-current apparatus from the Westinghouse Electric & Mfg. Co.

Mr. C. M. Walsh, one of the officers of the Falls Hollow Staybolt Co. of Cuyahoga Falls, O., says that one of the most pleasing features of their business is the satisfaction shown by everybody who uses their staybolt iron. Their customers now include marine boiler manufacturers, railway companies and locomotive builders all over the United States. The Falls company manufactures both hollow and solid staybolt iron and use the best double-refined charcoal iron or steel. They guarantee every bar. Among advantages claimed for the hollow staybolt are these: The hole is central and of any size desired, extending clear through the entire length of the bolt, making the bolt flexible and strength uniform; end next fire box may be closed or left open as desired, for the admission of air to aid combustion of fuel; hole ⅛ to 3/16 in. diameter is mostly used; drilling telltale holes is unreliable and weakens staybolts causing them to break at the vital point; staybolts rolled hollow from the solid material are stronger and more flexible than a solid or drilled bolt; they save inspection and explosions—warn automatically, and consequent loss of life and property is averted.

Joseph Allen of Collingswood, N. J., inventor and manufacturer of Allen's condenser tube packings is finding quite a market for his specialty on the great lakes. Of course the packings had already reached a large sale all over the country but he is especially pleased with the lake trade. J. S. Morton, secretary and treasurer of the Graham & Morton Line of Chicago, says in a letter to Mr. Allen: "This is the second year in which we have used your packing for tubes of the condenser of the steamer Puritan. It has proven so satisfactory to our chief engineer that he would not think of using anything else." Mr. George L. Craig, vice-president of the Craig Ship Building Co. of Toledo, says: "We have recently built six steamers, whose condensers have all been packed with your packing, and it has given the very best satisfaction in all cases. We can recommend it to any of your customers as being the best condenser tube packing in the market that we know of. Hoping this will help you to sell a good thing, we remain yours, etc."

Proposals for Dredging: U. S. Engineer Office No. 185 Euclid Ave., Cleveland, Ohio, August 27, 1902. Sealed proposals for improving Port Clinton Harbor, Ohio, by dredging will be received at this office until 2 P. M Sept. 26 1902, and then publicly opened. Specifications, blank forms, and all available information will be furnished on application to this office. Major Dan C. Kingman, Corps of Engineers, U. S. A. Sept. 18